

Gina McCarthy
Commissioner

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

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August 13, 2007

Senator John Fonfara, Co-Chair
Representative Steve Fontana, Co-Chair
Energy and Technology Committee, Room 3900
Legislative Office Building
Hartford, CT 06106

Re: Public Act 07-4-DEP's Report on Alternative Fuels.

Dear Senator Fonfara and Representative Fontana:

In 2007, the Connecticut General Assembly enacted Public Act 07-4 (the Act) during the June Special Session. Section 35 of the Act directed the Department of Environmental Protection (DEP), in consultation with the Department of Administrative Services (DAS), to: make a determination as to whether the State qualifies for a waiver from the alternative fuel purchase requirements of the federal Energy Policy Act of 2005 (EPAct); develop a plan to increase the utilization of existing alternative fuel fueling stations; and develop a plan to utilize any alternative fuel vehicle credits accrued by the State under EPAct for the purchase of hybrid electric vehicles.

In addition to the enactment of Public Act 07-4, Connecticut Governor M. Jodi Rell asked DAS to convene a task force to include DEP, Department of Transportation (ConnDOT), and the Office of Policy and Management (OPM) to submit recommendations on increasing fuel diversity in the state fleet and the advisability of following an alternative compliance path for the meeting EPAct requirements. As directed by the Governor, this collaborative effort resulted in the issuance of the report, "A Plan for Reducing the Use of Petroleum by the State of Connecticut Fleet: An Alternative Fuel Strategy" (the DAS Report) on July 23, 2006. DEP's evaluation builds upon the DAS Report to include some additional key findings including:

- The Governor's energy plan, "CT's Energy Vision for a Cleaner, Greener State", offers a path for promoting a diverse and sustainable energy policy to reduce petroleum use for the State of Connecticut. The Governor's energy plan includes the commitment that 20 percent of all energy used and sold in the State will come from clean or renewable resources, such as biodiesel, by 2020.
- DAS currently meets the EPAct's requirement that seventy-five percent of state fleet purchases be alternative fuel vehicles by purchasing flex fuel vehicles capable of using E85, a blend of 85 percent ethanol and 15 percent gasoline. ConnDOT's fleet is predominantly diesel fueled trucks that are not subject to EPAct alternative fuel vehicle purchase requirements.

Senator Fonfara and Representative Fontana

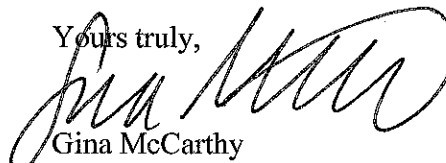
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- ConnDOT's annual purchase of ten gasoline-powered trucks is sufficiently offset by their increasing use of biodiesel. The use of biodiesel by ConnDOT fleet vehicles is estimated to increase from 140,000 gallons in 2006 to more than 250,000 gallons in 2007.
- The DAS Report evaluates multiple scenarios and demonstrates it is not possible to provide a reasonable, viable plan that qualifies Connecticut for an alternative compliance waiver under EPA Act.
- Connecticut should continue to work with the other Northeast states to encourage the federal Department of Energy to grant states increased flexibility in the qualification requirements for an alternative compliance waiver.
- The DAS Report provides a plan that will increase the availability and use of E85 by the State fleet up to eight times, at a reasonable cost.
- The DAS Report provides a plan that will reduce fleet greenhouse gas emissions by 3380 tons per year.
- A 2006 report on ethanol, developed by DEP and the Department of Public Health in response to Public Act 06-53 and available on DEP's website at <http://www.ct.gov/dep/lib/dep/air/fuels/etohstudy.pdf>, found increased use of E-85 in State fleet vehicles is not likely to adversely impact the ability of the State to meet its air quality objectives.
- Connecticut is on the forefront in purchasing hybrid electric vehicles and currently has 267. DAS plans to continue using alternative fuel vehicle credits under EPA Act to purchase hybrid electric vehicles, despite limitations in the choice of models.
- Continuing of the State's efforts to evaluate emerging technology may identify more effective strategies to reduce petroleum use and vehicle emissions while avoiding capital expenditures that result in stranded infrastructure costs.

The full report and other related information can be found on the DEP website at <http://www.ct.gov/dep>. We welcome the opportunity to work with you to build on our ongoing efforts to provide real reductions in petroleum use by the State fleet. Thank you for your commitment to increase the diversity of fuels available to the State fleet.

Yours truly,



Gina McCarthy
Commissioner, DEP

GM/TRB/wfm

cc: Tom Tyler, DEP
Enclosure



Public Act No. 07-4, Section 35

Report on Alternative Fuels

Report to the Energy and Technology Committee
of the
Connecticut General Assembly

August 2007



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These requests may be made directly to Marcia Z. Bonitto, ADA Coordinator, via e-mail: Marcia.Bonitto@po.state.ct.us

Cover Photos: Patrice Kelly, Michigan Department of Agriculture, U.S DOE
EERE Alternative Fuels Data Center

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Executive Summary

In 2007, the Connecticut General Assembly enacted Public Act 07-4 (the Act) during the June Special Session. Section 35 of the Act directed the Department of Environmental Protection (DEP), in consultation with the Department of Administrative Services (DAS), to:

- Make a determination as to whether the State qualifies for a waiver from the alternative fuel purchase requirements of the federal Energy Policy Act of 2005 (EPAAct);
- Develop a plan to increase the utilization of existing alternative fuel fueling stations; and
- Develop a plan to utilize any alternative fuel vehicle credits accrued by the State under EPAAct for the purchase of hybrid electric vehicles.

This report is in response to the General Assembly's request. In addition to the enactment of Public Act 07-4, Connecticut Governor M. Jodi Rell asked DAS to convene a task force to include DEP and The Department of Transportation (ConnDOT) to submit recommendations on increasing fuel diversity in the state fleet and the advisability of following an alternative compliance path for the meeting EPAAct requirements. As directed by the Governor, this collaborative effort resulted in DAS writing the report, "A Plan for Reducing the Use of Petroleum by the State of Connecticut Fleet: An Alternative Fuel Strategy" (the Alternative Fuels report). The Alternative Fuels report is in Appendix 1. DEP's submission builds upon the Alternative Fuels report to include some additional key findings:

- The Governor's energy plan, "CT's Energy Vision for a Cleaner, Greener State", provides a useful guideline for promoting a diverse and sustainable energy policy to reduce petroleum use for the State of Connecticut. The Governor's energy plan includes the commitment that 20 percent of all energy used and sold in the State will come from renewable resources, such as biodiesel, by 2020.
- DAS currently meets the EPAAct requirement that seventy-five percent of state fleet purchases be alternative fuel vehicles by purchasing flex fuel vehicles capable of using E85, a blend of 85 percent ethanol and 15 percent gasoline. ConnDOT's fleet is predominately diesel fueled trucks that are not subject to EPAAct alternative fuel vehicle purchase requirements.
- ConnDOT's annual purchase of ten gasoline-powered trucks is sufficiently offset by their increasing use of biodiesel. The use of biodiesel (B-20) by ConnDOT fleet vehicles is estimated to increase from 140,000 gallons in 2006 to more than 250,000 gallons in 2007.
- The Alternative Fuels report evaluates multiple scenarios and demonstrates it is not possible to provide a reasonable, viable plan that qualifies Connecticut for an alternative compliance waiver under EPAAct.
- Connecticut should continue to work with the other Northeast states to encourage the federal Department of Energy to grant states increased flexibility in the qualification requirements for an alternative compliance waiver.
- The Alternative Fuels report provides a plan that will increase the availability and use of E85 by the existing State fleet up to eight times, at a reasonable cost.
- The Alternative Fuels report provides a plan that will reduce fleet greenhouse gas emissions by 3,380 tons per year.

- A 2006 report on ethanol, developed by DEP and the Department of Public Health in response to Public Act 06-53 and found in DEP's website at <http://www.ct.gov/dep/lib/dep/air/fuels/etohstudy.pdf>, found increased use of E-85 in State fleet vehicles is not likely to adversely impact the ability of the State to meet its air quality objectives.
- Connecticut is on the forefront in purchasing hybrid electric vehicles and currently has 267. DAS plans to continue using alternative fuel vehicle credits under EAct to purchase hybrid electric vehicles, despite limitations in the choice of models.
- Continuation of the State's efforts evaluating emerging technology may identify more effective strategies to reduce petroleum use and vehicle emissions while avoiding capital expenditures that result in stranded infrastructure costs.

Background

EAct is administered through the United States Department of Energy (DOE). State fleets, other than those designated for emergency response and public safety, must comply with the act and its regulations. State fleets covered by EAct have two avenues for compliance. One avenue is for current and future annual vehicle and light truck purchases to consist of 75% alternative fuel vehicles¹. This is termed *standard compliance*.

The other avenue for EAct compliance is to seek an *alternative compliance waiver*. To qualify for an alternative compliance waiver, a covered state fleet must provide a plan that demonstrates an annual petroleum reduction equal to the amount of petroleum it would have reduced if the fleet's required alternative fueled vehicles acquired in earlier years and other alternative fueled vehicles for which a waiver is requested operated on alternative fuel 100 percent of the time. This goal is measured in GGE or gasoline gallon equivalents that will be reduced. A state fleet can reduce their GGE by conservation (reducing the vehicle miles traveled or using more fuel efficient vehicles) or by fuel replacement (replacing gallons of gasoline used with gallons of E85² or CNG³--although this is not a 1 to 1 relationship). It needs to be emphasized that a viable plan for meeting the aggressive annual petroleum reduction goal is required *before* a state entity *can apply* for the alternative compliance waiver. Furthermore, fines can be levied if the goal is not met.

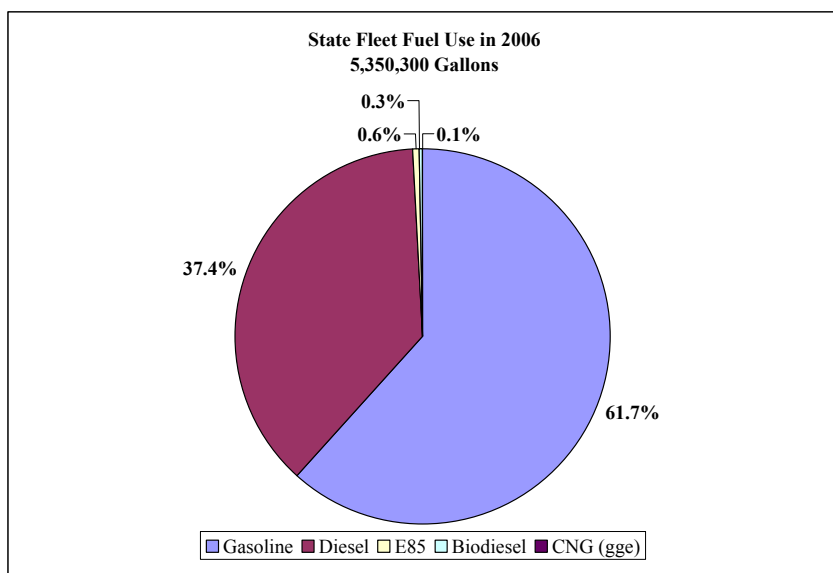
DAS and ConnDOT have met the standard compliance requirements since the inception of the law: DAS by purchasing a large number of flex fuel E85 and bi-fuel CNG vehicles over the course of many years; and, ConnDOT by sufficiently offsetting their annual purchase of ten gasoline-powered trucks through their increasing use of biodiesel. Eighty percent of ConnDOT's fleet is comprised of diesel-powered vehicles: purchases of diesel-powered vehicles are not covered under EAct state fleet alternate fuel vehicle purchase requirements. The volumes and locations of State-owned facilities dispensing E85 and biodiesel may be found in the Appendix.

¹ With the exception that if more than 75% of purchases for a year consist of flex fuel vehicles, those purchases may be applied as credits for purchases in subsequent years of other types of vehicles such as HEVs or Hybrid Electric Vehicles which do not count as part of EAct compliance although they do count towards petroleum reduction plans for NEW purchases (*not* vehicles already purchased).

² Gasoline that is blended 85% ethanol and 15% gasoline. There are presently 2 state ConnDOT pumping stations dispensing E85 and there are no commercial fueling stations in Connecticut. Gasoline in Connecticut is already 10% ethanol.

³ Compressed Natural Gas. There are presently 14 CNG pumping stations in Connecticut.

An analysis of the use of alternative fuels by State fleet vehicles indicates that in 2006 99% of the fuel used was petroleum based. The Governor's energy plan encourages a significant increase in alternative fuels, 20 percent of all energy used and sold in the State will come from renewable resources. OPM's Energy Management Unit has developed a plan titled "RENEWABLE ENERGY: A Plan for Achieving Results in State Government", and has developed a Memorandum of Agreement with the Institute for Sustainable Energy to implement step one of the plan, creating a comprehensive inventory of existing renewable usage in state government. A copy of the plan can be found in the Appendix. The OPM Energy Management Unit will continue working closely with state agencies to ensure the State leads by example and is working to implement strategies to achieve this goal.



In May 2007, Governor Rell asked the Departments of Administrative Services, Transportation, and Environmental Protection to examine the State's alternative fuel strategy in an effort to explore the State's compliance options under EPAct, increase the State's use of alternative fuels, and increase fuel diversification. This inter-agency effort resulted in the Alternative Fuels report.

In the June 2007 Special Session, the Connecticut General Assembly enacted Public Act 07-4. Section 35 of the Act directed the Department of Environmental Protection (DEP), in consultation with the Department of Administrative Services (DAS), to: make a determination as to whether the State qualifies for a waiver from the alternative fuel purchase requirements of the federal Energy Policy Act of 2005 (EPAct); develop a plan to increase the utilization of existing alternative fuel fueling stations; and develop a plan to utilize any alternative fuel vehicle credits accrued by the State under EPAct for the purchase of hybrid electric vehicles.

The Alternative Fuels report presents a comprehensive strategy to reduce petroleum use and increase the use of alternative fuels. Specifically, the Alternative Fuels report recommends reducing overall fleet miles driven by 5 percent, adding 150 new hybrid electric vehicles, increasing the use of E85 to 25 percent, continuing to use cars powered by compressed natural

gas (CNG), and initiating an outreach program for State employees to encourage them to refuel with alternative fuel when it is available and appropriate for their vehicle.

Environmental impacts of reducing gasoline usage and using ethanol-gasoline blends

An important aspect of the State's fuel reduction and diversification efforts, such as increasing the use of E-85, is the environmental impact of the strategies being considered. For example, the plan presented in the Alternative Fuels report will reduce the emissions of carbon dioxide, a potent greenhouse gas (GHG) by approximately the following amounts: reducing overall fleet miles driven 5 percent, 1340 tons per year; buying 150 new hybrids, 1490 tons per year; and, increasing the use of E85, 550 tons per year. The total GHG reduction from these strategies is 3380 tons per year.

In regard to E85, the Department of Environmental Protection (DEP) and the Department of Public Health (DPH) conducted a study of the effects related to the use of ethanol as a fuel additive in Connecticut. This 2006 report, developed by DEP and DPH in response to Public Act 06-53, may be found in DEP's website at <http://www.ct.gov/dep/lib/dep/air/fuels/etohstudy.pdf>.

The report concluded that while the use of ethanol in gasoline does not cause the release of any unique air toxics, the air quality impacts are mixed. Ethanol has the positive effects of reducing emissions of harmful air pollutants and GHGs, but could result in negative effects such as increased emissions of ozone precursors due to evaporation from permeation.

While the above report examines the use of 10% ethanol fuel blends, similar findings can be expected for E-85. It should be noted air pollution increases that may result from the permeation of ethanol-blended fuels through vehicle fuel systems for E-85 is less than permeation for 10% ethanol fuel blends currently used in Connecticut. When combined with the increased benefits of the California Low Emission Vehicle II program currently being implemented in Connecticut, increased use of E-85 in State fleet vehicles is not likely to adversely impact the ability of the State to meet its air quality objectives.

Conclusion - Addressing PA 07-4 Section 35

The Alternative Fuels report addresses all of the requirements of Section 35 of the Act. DAS currently meets the EPAct requirement that seventy-five percent of state fleet purchases be alternative fuel vehicles through standard compliance by purchasing flex fuel vehicles capable of using E85, a blend of 85 percent ethanol and 15 percent gasoline. The Alternative Fuels report demonstrates it is not possible to provide a reasonable, viable plan that qualifies Connecticut for an alternative compliance waiver under EPAct.

The Alternative Fuels report provides a plan to increase alternative fuel usage in State fleet vehicles. Specifically, the Plan recommends increasing the annual use of E85 from 33,000 gallons to 272,864 GGE. In addition, use of biodiesel by the ConnDOT fleet vehicles is estimated to increase from 140,000 gallons in 2006 to more than 250,000 gallons in 2007.

Connecticut is on the forefront in purchasing hybrid electric vehicles and currently has 267. The Alternative Fuels report provides a plan to continue using alternative fuel vehicle credits under EPAct to purchase hybrid electric vehicles, despite limitations on quantities available for purchase and choice of models. The plan includes the purchase of an additional 150 hybrid electric vehicles.

The Governor's energy plan, "CT's Energy Vision for a Cleaner, Greener State", provides a useful guideline for promoting a diverse and sustainable energy policy to reduce petroleum use for the State of Connecticut. The Governor's energy plan includes the commitment that 20 percent of all energy used and sold in the State will come from clean or renewable resources, such as biodiesel, by 2020.



Senate Bill No. 1500

June Special Session, Public Act No. 07-4

**AN ACT IMPLEMENTING THE PROVISIONS OF THE BUDGET
CONCERNING GENERAL GOVERNMENT.**

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Sec. 35. (*Effective from passage*) (a) Not later than August 1, 2007, the Commissioner of Environmental Protection, in consultation with the Commissioner of Administrative Services, shall, in good faith, make a determination as to whether the state qualifies for a waiver from the alternative fuel vehicle acquisition requirements of the federal Energy Policy Act of 2005, and whether it is in the best interest of the state to apply for such waiver. If the Commissioner of Environmental Protection, in good faith, determines that the state qualifies for such a waiver, and that it is in the best interest of the state to apply, the Commissioner of Administrative Services shall immediately apply for such waiver.

(b) Not later than September 1, 2007, the Commissioner of Environmental Protection, in consultation with the Commissioner of Administrative Services, shall develop a plan to increase the utilization of existing ethanol fueling stations, existing natural gas fueling stations and any other existing alternative fuel fueling stations in the state. Such plan shall be updated periodically.

(c) Not later than September 1, 2007, the Commissioner of Environmental Protection, in consultation with the Commissioner of Administrative Services, shall develop a plan to utilize any alternative fuel vehicle credits the state may have under the Energy Policy Act of 2005, including, but not limited to, credits earned by the Departments of Transportation and Public Safety, for the purchase of hybrid electric vehicles by the state.

A PLAN FOR REDUCING THE USE OF PETROLEUM BY THE STATE OF CONNECTICUT FLEET: AN ALTERNATIVE FUEL STRATEGY

July 23, 2007

Executive Summary

Connecticut Governor M. Jodi Rell asked the Connecticut Department of Administrative Services (DAS) to convene a task force to include the Department of Transportation (ConnDOT), and Department of Environmental Protection (DEP) to submit recommendations on increasing fuel diversity in the state fleet and the advisability of following an alternative compliance path for the United States Department of Energy Policy Act (EPAAct). This document proposes several recommendations.

EPAAct is administered through the United States Department of Energy (DOE). State fleets, other than those designated for emergency response and public safety, must comply with the act and its regulations. State fleets covered by EPAAct have two avenues for compliance. One avenue is for current and future annual vehicle and light truck purchases to consist of 75% alternative fuel vehicles¹. This is termed *standard compliance*. DAS embraced and has met this avenue of compliance since the inception of the law by purchasing a large number of flex fuel E85 and bi-fuel CNG vehicles over the course of many years.

The other avenue for EPAAct compliance is to seek an *alternative compliance waiver*. To qualify for an alternative compliance waiver, a covered state fleet must provide a plan that demonstrates an annual petroleum reduction equal to the amount of petroleum it would have reduced if the fleet's required alternative fueled vehicles acquired in earlier years and other alternative fueled vehicles for which a waiver is requested operated on alternative fuel 100 percent of the time. This goal is measured in GGE or gasoline gallon equivalents that will be reduced. A state fleet can reduce their GGE by conservation (reducing the vehicle miles traveled or using more fuel efficient vehicles) or by fuel replacement (replacing gallons of gasoline used with gallons of E85² or CNG³--although this is not a 1 to 1 relationship). It needs to be emphasized that a viable plan for meeting the aggressive annual petroleum reduction goal is required *before* a state entity *can apply* for the alternative compliance waiver. Furthermore, fines can be levied if the goal is not met.

¹ With the exception that if more than 75% of purchases for a year consist of flex fuel vehicles, those purchases may be applied as credits for purchases in subsequent years of other types of vehicles such as HEVs or Hybrid Electric Vehicles which do not count as part of EPAAct compliance although they do count towards petroleum reduction plans for NEW purchases (*not* vehicles already purchased).

² Gasoline that is blended 85% ethanol and 15% gasoline. There are presently 2 state ConnDOT pumping stations dispensing E85 and there are no commercial fueling stations in Connecticut. Gasoline in Connecticut is already 10% ethanol.

³ Compressed Natural Gas. There are presently 14 CNG pumping stations in Connecticut.

Using tools provided by the U. S. Department of Energy (DOE), the Connecticut Department of Administrative Services has determined that seeking the alternative compliance waiver is *not* viable for the near term because it is currently not possible to develop a reasonable, viable plan that will reduce petroleum consumption by the required amount. However, there are petroleum reduction goals that the state of Connecticut fleet managed by DAS can and should meet. Meeting the goals will require a combination of strategies including: 1) improving our infrastructure for bringing alternative fuels to state Department of Transportation filling stations, 2) changing the behavior of the state employees who use our state fleet vehicles aimed at reducing the use of petroleum and reducing vehicle miles traveled (VMT) and 3) adding to our fleet of Hybrid Electric Vehicles. These goals are consistent with the Governor's Energy Vision and the Connecticut Climate Action Plan. There will be increased costs to the state in order to meet these goals. But, as the Governor has stated, we will enhance Connecticut's status as a national model for energy technology and conservation and set an example to promote the use of biofuels and renewable forms of energy.

Background

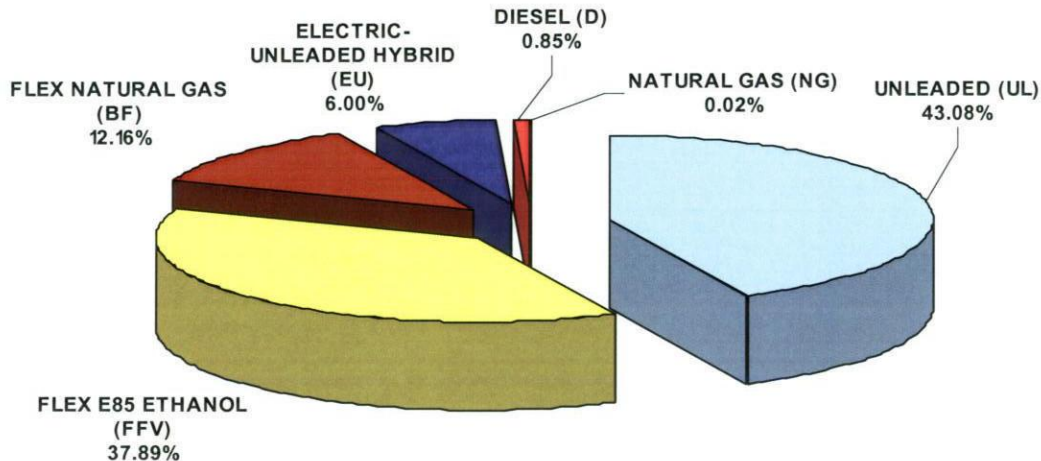
The state of Connecticut fleet managed by DAS is already diverse with respect to the alternative fuels they can use. While gasoline fueled vehicles are the largest single group of vehicles, they make up only 43% of the fleet. From our approximately 4,200 rolling stock of vehicles, 1,740 are E85 flex fuel (can use gasoline or E85), 524 are bi-fuel CNG (can use gasoline and compressed natural gas), and 1 is dedicated CNG (can only use compressed natural gas). The state also has 267 Hybrid Electric Vehicles or HEVs in operation.

DAS is responsible for providing vehicles to meet the needs of the agencies and tracking their use and maintenance. State agencies essentially lease the vehicles from DAS and use the vehicles according to DAS regulations. To some extent DAS fleet purchases on behalf of state agencies must meet agency-operating needs. However, increasing the number of alternative fuel vehicles can be at odds with the needs of agencies and their employees. One example of this pertains to the only bi-fuel CNG passenger vehicle model that was available for DAS to purchase in order to help diversify our fleet. The CNG fuel tank was discovered to take up most all of the trunk space of the vehicle. If the trunk of these cars is needed to store and transport state equipment, the bi-fuel CNG did not meet the needs of the employee or agency regardless of the environmental benefits provided. Department of Children and Families child protection workers found bi-fuel CNG vehicles particularly troublesome because they could not store child seats in the trunk for use with children who had to be removed from their home and safely transported to other locations.

In order for DAS to continue to hold standard compliance with EPAct on an annual basis, seventy-five percent of all new vehicles purchased must be able to run on alternative fuels. The ongoing compliance of the state of Connecticut with this requirement has been chiefly responsible for the current configuration of the state fleet that is managed by DAS. We have purchased more than seventy-five percent alternative fuel vehicles in some previous years. This practice earned us credits that we can use to purchase other

vehicle types such as HEVs in exchange for alternative fuel vehicles against the required percentage.

DAS Managed State Fleet Composition By Fuel Type



However, with 40% of the DAS fleet vehicles capable of using E85 or CNG alternative fuels, the volume of alternative fuels actually used in those vehicles is small in comparison to the total fleet gasoline consumption. In 2006, the two available Department of Transportation E85 fueling stations dispensed less than 33,000 gallons of E85 fuel. This compares to the 3,300,000 gallons of gasoline used by the state fleet in 2006. Several issues, including the lack of adequate alternative fuel infrastructure and the cost of alternative fuel, are currently limiting the use of alternative fuels in DAS fleet vehicles.

Environmental impacts of using ethanol-gasoline blends

An important aspect of the State's fuel diversification efforts, such as increasing the use of E85, is the environmental impact of the alternative fuels being considered. In this regard, the Department of Environmental Protection and the Department of Public Health (DPH) conducted a study of the effects related to the use of ethanol as a fuel additive in Connecticut.

This 2006 report, developed by DEP and DPH in response to Public Act 06-53, may be found in DEP's website at the following location:

www.ct.gov/dep/lib/dep/air/fuels/etohstudy.pdf.

There were many key and important findings in the report. Most pertinent here is that while the use of E85 helps to reduce the state's dependence on fossil fuels as set out in the Governor's Energy Plan, the environmental and health benefits of using E85 are not as clear.

The Case Against Seeking The Alternative Compliance Waiver

The US DOE has provided fleet managers an Alternative Compliance Planning Tool that is used to determine if a proposed alternative compliance plan qualifies for an Alternative Compliance Waiver under EPAct. First, DAS used the Alternative Compliance Planning Tool to determine that in order to qualify for an Alternative Compliance Waiver, a Connecticut alternative compliance plan would have to demonstrate a reduction in petroleum use of 1,234,425 GGE for the next model year (September 1, 2007 and August 31, 2008).

Next, DAS used the Alternative Compliance Planning Tool to evaluate several reasonably viable scenarios and determine if any of them meet the petroleum use reduction target established above. The details of the scenarios evaluated are listed in the table below.

It cannot be overemphasized that a plan for meeting 100% of the 1,234,425 GGE goal is necessary to *apply* for the alternative compliance waiver.

GGE APPRAISAL FOR CT FLEET	Reduce Vehicle Miles Traveled⁴	Buy New HEVs⁵	Use More E85⁶	Use More CNG⁷	1,234,425 GGE Goal Needed for CT Waiver
Scenario "A"	Reduce fleet miles by 3%	Buy 100 new HEVs	Use 10% E85 ⁸	Use 10% CNG	Only 21% of GGE goal realized
GGE Reduction	79,036	35,127	109,145	32,932	256,240
Scenario "B"	Reduce fleet miles by 5%	Buy 150 ⁹ new HEVs	Use 25% E85	Use 25% CNG	Only 44% of GGE goal realized
GGE Reduction	131,727	52,691	272,864	82,330	539,612

⁴ Basing the reduction in miles traveled on 13,800 average miles per year per vehicle currently traveled.

⁵ The existing fleet of 267 Hybrid Electric Vehicles (HEVs) *does not* contribute to our calculation of GGE. However, Governor Rell and other local state leaders are working to get the status of these vehicles changed.

⁶ Current use of E85 is estimated to be 3% with two ConnDOT state pumping stations and zero commercial stations for our 1,740 alternative fuel E85 fleet vehicles.

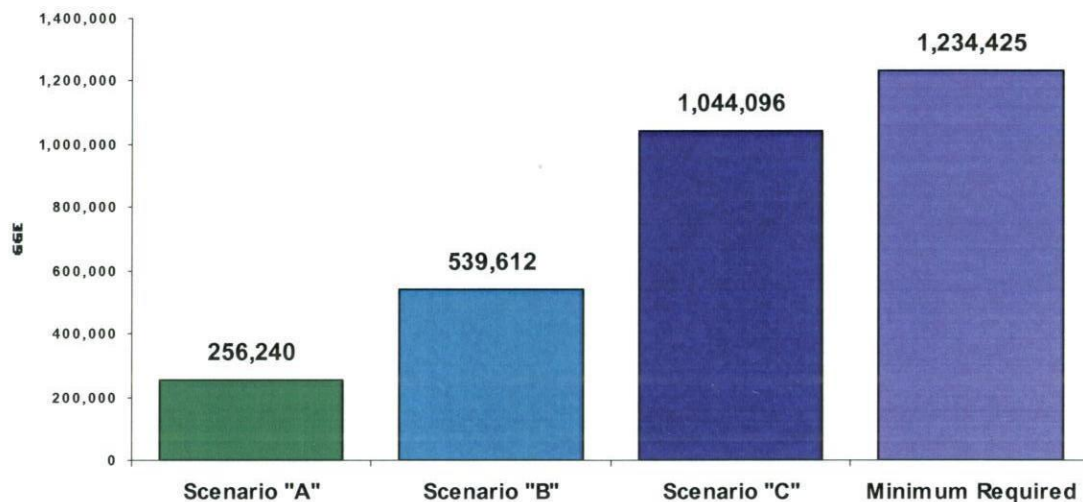
⁷ Current use of Compressed Natural Gas (CNG) is estimated to be less than 1% with fourteen pumping stations. The State of Connecticut currently owns 524 Compressed Natural Gas alternative fuel vehicles and one dedicated CNG vehicle.

⁸ Two ConnDOT pumping stations delivered 32,988 gallons of E85 in 2006. Only two additional pumping stations can be converted for dispensing E85 fuel with relatively minor modifications without a huge disruption in the amount of gasoline that can be dispensed. Other locations may require new tanks and equipment.

⁹ In point of fact, upon contacting dealers about the availability of HEVs, it is unrealistic to expect more than 150 of these vehicles to be available for purchase by the state of Connecticut next year.

GGE APPRAISAL FOR CT FLEET	Reduce Vehicle Miles Traveled ⁴	Buy New HEVs ⁵	Use More E85 ⁶	Use More CNG ⁷	1,234,425 GGE Goal Needed for CT Waiver
Scenario "C"	Reduce fleet miles by 10%	Buy 200 new HEVs	Use 50% E85	Use 50% CNG	Only 85% of GGE goal realized
GGE Reduction	263,455	70,255	545,727	164,659	1,044,096

GGE Reduction Afforded by Different Scenarios



The graph above demonstrates none of the reasonably viable scenarios evaluated by DAS reach the minimum required petroleum use reduction target. Any plan for the next model year that would meet the minimum required petroleum use reduction target would have to include measures so extreme, it would not be possible to implement the plan. This clearly demonstrates it is not possible to develop a Connecticut alternative compliance plan that qualifies for an Alternative Compliance Waiver under EPAct. Further, there are a number of issues that deeply complicate our state's ability¹⁰ to make GGE reductions of significant magnitude:

1. Manufacturers are making fewer rather than more models of E85 flex fuel vehicles for the current model year and the models available do not fit the mold for what the public would consider to be the typical, modest fleet vehicle, suitable for use by public servants (fewer appropriate models of vehicles are available);
2. Hybrid Electric Vehicles have only been available in limited quantities, which have moderated the number available for DAS to purchase. While manufacturers

¹⁰ New Hampshire and Massachusetts have abandoned any plans to apply for a waiver upon doing the "math" on their potential to save GGE even though they, like Connecticut, submitted an intent to apply for a waiver. Maine and Vermont are exempt from EPAct based on the number of vehicles in those states.

are responding to the higher-than-expected demand for these vehicles, DAS anticipates this lag to continue for the near term;

3. There are no commercial E85 stations in our region of the country and the only two available in Connecticut are in Department of Transportation filling stations (no commercial response to E85 is visible in the region and we will need to bump out our infrastructure);
4. There is no distilling of ethanol in our region of the country although we have the facilities for blending ethanol with gasoline in Connecticut (all ethanol must be shipped to Connecticut and from long distances which will probably keep prices high for the foreseeable future);
5. The price of E85 fuel is roughly twice the amount per gallon of gasoline for Connecticut (more expense per gallon of fuel) although the State's E85 fuel supplier has told DAS the price will decrease as volume increases;
6. Bi-fuel CNG vehicles are no longer being manufactured in favor of dedicated CNG vehicles (more apprehension about available fuel stations when tanks are running low and hence, less acceptance for agency use);
7. Most of our Department of Transportation gas stations are single pump facilities. New tanks and pumps would be required to equip them for E85 (additional expense to the state and disrupted service to other customers during construction);
8. It is not entirely clear that E85 is the fuel of the future for this part of the country (more uncertainty on future payoff for current infrastructure investments);
9. The fuel economy per gallon for CNG or E85 fuels is not as good as for a gallon of gasoline (more expense per miles of travel and less miles per tank);
10. There is no viable way to police what fuel is or is not being pumped into state flex fuel vehicles by state employees (enforcement of measures to curb petroleum use may be difficult).

A PLAN FOR REDUCING THE USE OF PETROLEUM BY THE STATE OF CONNECTICUT FLEET

While it is demonstrated above that it is not possible to develop a Connecticut alternative compliance plan that qualifies for an Alternative Compliance Waiver under EPA's Act for the near term, there are other options we can adopt that will not only foster a real GGE reduction in petroleum use by the state fleet but will also keep us from over committing to any one direction in an uncertain environment for alternative fuels, which is best for us as we diversify our fleet. This will allow us to move quickly as new options present themselves. Furthermore, we will be able to maintain our EPA's Act "standard" compliance by purchasing 75% flex fuel vehicles in the coming year. Nothing in the plan precludes applying for the alternative compliance waiver in years to come if this is in the best interest of the state.

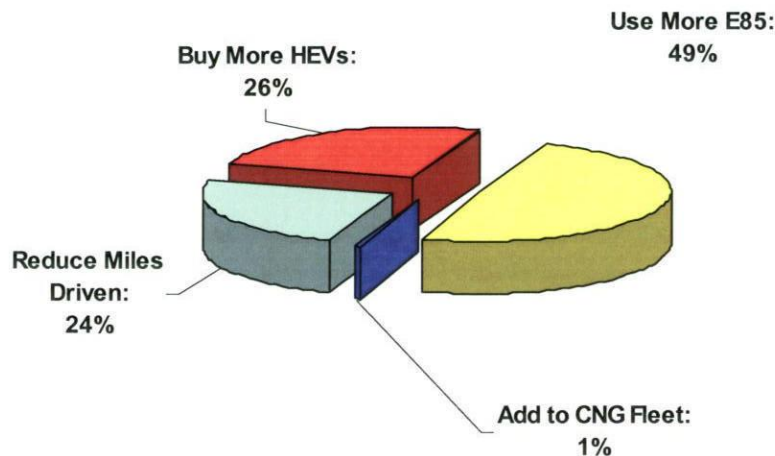
GGE APPRAISAL FOR CT FLEET	Reduce Vehicle Miles Traveled	Buy New HEVs	Use More E85	Use CNG at no less than existing levels	
Plan	Reduce fleet miles driven overall by 5%	Buy 150 new HEVs	Increase usage of E85 to 25%	Maintain use of CNG and strategically	Potential GGE

			and add two pumps to support greater use	add CNG vehicles to the fleet	benefit to the state
GGE Reduction	131,727	146,481	272,864	3,293	554,365

This presents a balanced approach to petroleum use reduction for the near term. As shown in the chart below, one goal will be an overall 5% reduction in miles driven. For a fleet where the average number of miles driven per year per vehicle is 13,800, this would mean a reduction to 13,110 or 690 miles, on average. This is clearly achievable and we are willing to provide a trade-off if agencies cannot reduce their miles driven by this margin in a manner to be explained later.

The addition of 150 HEVs would bring our total number of HEVs in our fleet to 417. DAS set the number at 150 because this is the projected near term availability according to distributors of these vehicles. HEVs can achieve 50 miles per gallon using fuel available anywhere in comparison to normal fleet vehicles that achieve 22 miles per gallon. If we earn additional credits from future alternative fuel vehicle purchases in excess of seventy-five percent, we will use them for additional HEVs, as they are available, to continue our quest to further diversify our fleet and reduce the use of petroleum.

Plan for Reducing Petroleum Use: Percent Contribution to GGE Reduction Goal for DAS Fleet



Another strategy is to increase the use of E85 from the current projected level of 3% of total fuel used to 25%. DAS and DOT conducted a review of State fueling facilities and identified two high volume fueling facilities that could be converted to dispense E85 at a reasonable cost. Adding the availability of E85 at these fueling facilities in Norwich and Buckingham Street, Hartford, in addition to the two existing E85 fueling facilities will increase the use of E85 by as much as eight times (see the vehicle distribution map on the last page). Further, we are assessing the costs of strategically adding aboveground pumps

to some single pump stations because of the lower installation costs in comparison to buried tanks¹¹.

This strategy includes outreach efforts to agencies to encourage their employees to use the E85 in their flex fuel vehicles when an E85 fueling facility is reasonably nearby—hence, behavioral change is a necessary part of the equation. Further, in the trade-off alluded to above, agencies that can achieve 35% E85 use will have no need to reduce their miles driven by 5% because they will have achieved a comparable and measurable offset in petroleum use.

We will still have CNG bi-fuel vehicles in our rolling stock and there are 14 CNG pumping stations. Therefore, it should be impressed upon state employees that they should also increase the use of this alternative fuel in order to further assist the state in meeting its goals.

Further, we strongly endorse the future purchase of diesel passenger vehicles using B20 biodiesel fuel as they become available upon meeting environmental standards for use in the northeast. Our Connecticut Department of Transportation has made very effective use of B20 diesel fuel in its 912 on road and 365 off-road vehicles¹² plus they have formed an effective infrastructure for dispensing this kind of fuel around the state. Any diesel-powered vehicle can burn B20 fuel. The impediment is that clean air standards cannot be met by the vast majority of these passenger vehicles in our region of the country at the present time, which makes them unavailable for DAS to purchase.

Finally, the state of Connecticut has a vehicle lease arrangement with the Enterprise rental car company that served to replace the Hartford area motor pool. Every effort will be made to encourage them to provide Hybrid Electric Vehicles for use by state employees who make short-term rentals. While this will not be a petroleum use reduction to the state government, it will help the overall reduction in the use of petroleum for vehicles driven in the state.

In Conclusion

DAS is constantly evaluating and monitoring the availability of fleet vehicles that make use of alternative and diverse sources of power. We find it unfortunate that the alternative compliance waiver program leans so heavily on the use of alternative fuels, which impedes diversification of our fleet in many respects.

We believe that the plan presented is a reasonable and an achievable approach to 1) reducing our petroleum use, which is the ultimate goal of EAct and 2) alternative fuel diversification that better meets the capacity already waiting in our fleet. We can achieve this without the alternative compliance waiver. The goals can be achieved while the

¹¹ Although there are requirements that these tanks be a certain distance from any other structure which may limit our options.

¹² ConnDOT also has a fleet of 1,571 vehicles (exclusive of Bradley airport vehicles and Connecticut Transit vehicles) that has met EAct standard compliance requirements. In addition to the diesel vehicles, they have 221 unleaded gasoline vehicles, 67 E85 flex fuel vehicles and 6 CNG bi fuel vehicles.

State of Connecticut continues to use standard compliance with EPA Act. There is nothing that precludes the state of Connecticut from applying for an alternative compliance waiver for future model years but it is currently not possible to develop a viable alternative compliance plan that would allow Connecticut to qualify for Alternative Compliance Waiver under EPA Act.

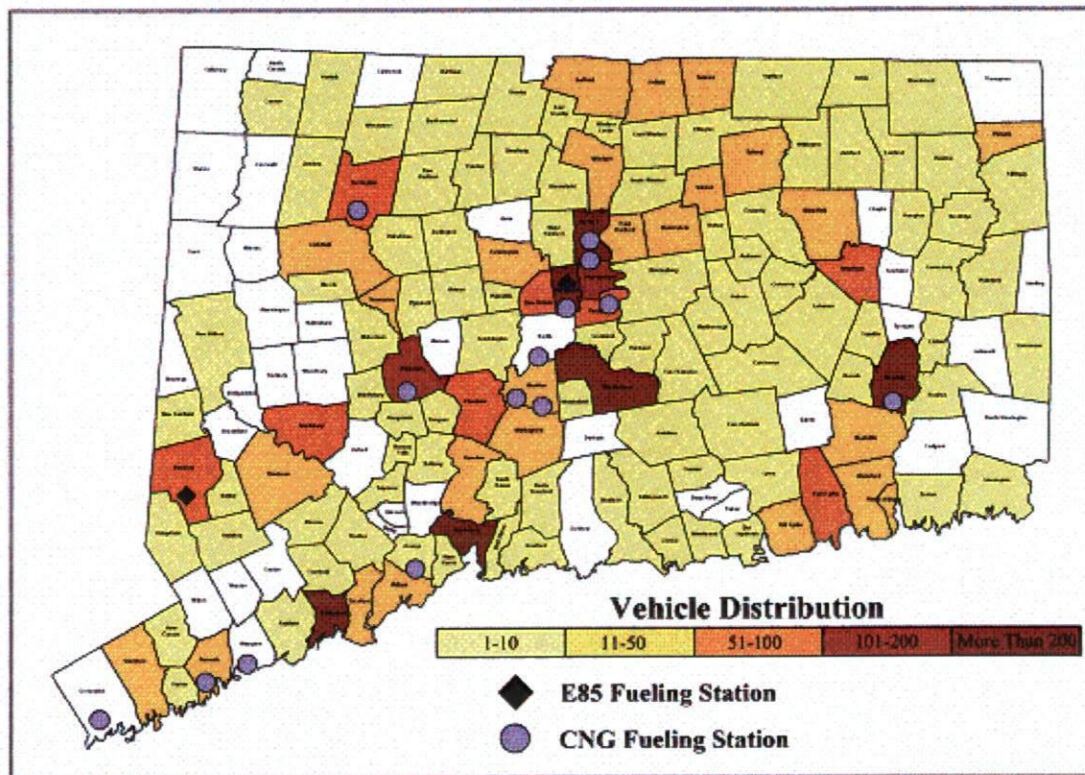
There are many uncertainties presented by the auto manufacturers, ethanol distillers, ethanol distributors and new technologies under development (albeit presently unavailable). Therefore, a goal oriented and prudent course of action is what is required at the present time, coupled with modest additions to our infrastructure, in order to achieve petroleum reduction and alternative fuel diversification.

The aforementioned goals can be met by 1) improving our infrastructure in order to use more E85 by adding two new E85 fuel pumps to state filling stations in Norwich and Hartford and looking towards further expansions elsewhere, 2) changing the behavior of the state employees who use our state fleet vehicles aimed at reducing the use of petroleum by filling their flex fuel vehicles with E85 and driving less and 3) adding to our existing fleet of Hybrid Electric Vehicles and dedicated CNG vehicles.

Meeting the GGE plan goal will come at a cost to the state. Among the contributors: adding the two E85 pumps at an estimated cost of \$30,000 each; paying roughly twice as much for every gallon of E85 pumped in comparison to every gallon of gasoline it replaced; and the increased costs to agencies for vehicle leases because of buying more expensive HEV and CNG passenger vehicles. However, the state must lead by example in reducing the use of petroleum. The foregoing plan will move us further along our way in this important direction.

Appendix

Mapping of Connecticut towns by vehicle distribution and the availability of current alternative fuel fueling stations.



RENEWABLE ENERGY:
A Plan for Achieving Results in State Government

**State of Connecticut
Office of Policy & Management
Energy Policy Unit**

December 2006

INTRODUCTION

In April 2004 Governor Rowland issued Executive Order #32. This Executive Order required that the State of Connecticut, as part of its own consumption of energy resources, replace an increasing share of its electricity needs with energy derived from renewable energy resources. Under Executive Order #32, a goal of 20% renewable by 2010 was promulgated. A goal of this report is to present background information to State decision-makers on the various types of renewable resources available to the State as it strives to achieve this goal. In addition, this report aims to lay out a plan for the State to follow so that the stated renewable goals can be achieved in a fiscally responsible manner and within the time frames expected. While Governor Rowland's Executive Order serves as the basis for this report, the goals of Governor Rell's recently announced *Connecticut's Energy Vision* have been incorporated as well.

RENEWABLE ENERGY TECHNOLOGIES

Renewable energy is from an energy resource that is replaced by a natural process at a rate that is equal to or faster than the rate at which that resource is being consumed. Renewable energy can come from a variety of sources. Renewable energy generally means solar, wind, water, wood or other biomass source of energy and geothermal energy. In Connecticut, renewable energy is categorized into three classes, particularly when used in connection with the generation of electricity.

Class I renewable energy source - energy derived from solar power, wind power, a fuel cell, methane gas from landfills, or a biomass facility, including, but not limited to, a biomass gasification plant that utilizes land clearing debris, tree stumps or other biomass that regenerates or the use of which will not result in a depletion of resources, provided such facility begins operating on or after July 1, 1998, and such biomass is cultivated and harvested in a sustainable manner;

Class II renewable energy source - energy derived from a trash-to-energy facility, or a biomass facility that does not meet the criteria for a Class I renewable energy source or a hydropower facility, provided such facility has a license issued by the Federal Energy Regulatory Commission, has been exempted from such licensure is the subject of a license application or notice of intent to seek a license from said commission, has been found by the Commissioner of Environmental Protection to be operating in compliance with the federal Clean Water Act, or has been found by the Canadian environmental assessment agency to be operating in compliance with said agency's resource objectives;

Class III renewable energy source - the electricity output from combined heat and power systems with an operating efficiency level of no less than fifty per cent that are part of customer-side distributed resources developed at commercial and industrial facilities in this state on or after January 1, 2006, or the electricity savings created at commercial and industrial facilities in this state from conservation and load management programs begun on or after January 1, 2006.

While Governor Rowland's Executive Order was limited to Class I renewable resources, Governor Rell's Connecticut's Energy Vision is more broadly written. In addition to keeping the intent for development of Class I renewable, Governor Rell seeks a broader renewable mandate for the use of renewable energy in all consuming sectors (not just electricity). To the extent that the State is also a significant consumer of transportation and other types of fuels, the incorporation or extension of a renewable goal to these efforts is in keeping with the Governor's intent.

As noted earlier, renewable energy can come from many different sources and technologies. The next section provides an overview of the various resources or technologies that best fit the goals of meeting a 20% renewable content to State government's energy mix by 2020.

FUEL CELLS

A fuel cell is an electrochemical device that combines hydrogen and oxygen to produce electricity, with water and heat as its by-product. As long as fuel is supplied, the fuel cell will continue to generate power. Since the conversion of the fuel to energy takes place via an electrochemical process, not combustion, the process is clean, quiet and highly efficient – two to three times more efficient than fuel burning.

No other energy generation technology offers the combination of benefits that are provided by fuel cells. In addition to low or zero emissions, benefits include high efficiency and reliability, multi-fuel capability, siting flexibility, durability, and ease of maintenance. Fuel cell technology is also scalable and can be stacked until the desired power output is reached. Since fuel cells operate silently, they reduce noise pollution as well as air pollution. An important aspect of fuel cell technology is that the waste heat produced as part of the electricity generation process must be used to provide other energy needs in order to achieve high overall energy and economic efficiency.

PHOTOVOLTAICS

Many corporations and institutions are currently developing ways to increase the practicality of solar power. While private companies conduct much of the research and development on solar energy, colleges and universities also work on solar-powered devices. A significant issue with solar panels is cost. Increase demand for silicon, a key component of solar panels, is causing upward pressure on the the price for photovoltaic (PV) systems. This has spurred developers to start using other materials and thinner silicon to keep cost down. Due to economies of scale, solar panels get less costly as people use and buy more — as manufacturers increase production, the cost is expected to continue to drop in the years to come. As of early 2006 average cost per installed watt has decreased to about \$4.50. (The average consumption of a U.S. home is about 1000 watts.)

Solar energy systems that are integrated or tied to the utility distribution system represent a large growth area. With incentives from state governments, power companies and the federal government, growth is expected to climb. Net metering programs are one type of incentive driving growth in solar panel use. Net metering allows electricity customers to get credit for any extra power they produce and send back into the grid. This would cause role reversal, as the utility company would be the buyer, and the solar panel owner would be the seller of electricity. Net metering is available in Connecticut, although under current law its applicability is limited. Governor Rell's *Connecticut's Energy Vision* seeks to broaden the applicability of net metering to a larger customer base, including the potential applicability to State buildings and facilities.

PASSIVE SOLAR DESIGN

A "passive" solar design provides cooling and heating to keep a building comfortable without the use of mechanical equipment. This style of construction results in buildings that respond to the changing environment.

For passive heating and cooling to be effective, the plan of the building, careful site selection and planning, construction materials, building features and other aspects are designed to collect, store and distribute the sun's heat in winter; and to block the sun's rays in summer. Passive solar buildings can be built in any architectural style and in any part of the country.

Passive solar design is likely to be a requirement of all future State buildings as it is an essential component of the high-efficiency standards and regulations currently being developed.

SOLAR THERMAL

Solar thermal systems utilize the power of the sun to generate heat, rather than electrical power. Solar thermal systems are very popular and cost-effective systems that operate under principles that are easily understood. In essence a solar thermal system uses the power of the sun to heat water for a variety of uses. The most common applications are solar water pre-heating and solar radiant floor heating.

GEOTHERMAL ENERGY

Geothermal energy is heat (thermal) derived from the earth (geo). It is the thermal energy contained in the rock and fluid (that fills the fractures and pores within the rock) in the earth's crust.

Geothermal energy can be classified as low temperature (less than 90°C or 194°F), moderate temperature (90°C - 150°C or 194 - 302°F), and high temperature (greater than 150°C or 302°F). The uses to which these resources are applied are also influenced by temperature. The highest temperature resources are generally used only for electric power generation. Current U.S. geothermal electric power generation totals approximately 2200

MW or about the same as four large nuclear power plants. Uses for low and moderate temperature resources can be divided into two categories: direct use and ground-source heat pumps.

Direct use, as the name implies, involves using the heat in the water directly (without a heat pump or power plant) for such things as heating of buildings, industrial processes, greenhouses, aquaculture (growing of fish) and resorts. Direct use projects generally use resource temperatures between 38°C (100°F) to 149°C (300°F).

Ground-source heat pumps use the earth or groundwater as a heat source in winter and a heat sink in summer. Using resource temperatures of 4°C (40°F) to 38°C (100°F), the heat pump, a device which moves heat from one place to another, transfers heat from the soil to the house in winter and from the house to the soil in summer.

Geothermal energy resources in Connecticut generally have a low temperature and are suitable only for geothermal heat pumps.

HYDROPOWER

Hydropower converts the natural flow of water into electricity to light our homes and power our industries. The energy is produced by the fall of water turning the blades of a turbine. The turbine is connected to a generator that converts the energy into electricity.

The amount of electricity a hydropower installation can produce depends on the quantity of water passing through a turbine (the volume of water flow) or on the height from which the water falls (the amount of head). The greater the flow and the head, the more electricity produced.

Some hydropower facilities include dams to increase the head of a waterfall or to control the flow of water, and reservoirs to store the water for future energy use (storage dam), while others produce electricity by immediately using a river's water flow (run-of-river). Some hydropower plants also use pumped storage systems, which store the water for reuse in the production of electricity during periods of high demand.

Hydropower is unique among energy sources for its operational flexibility. If there is an increased electricity demand, a hydropower plant can respond almost immediately by releasing more water. On the other hand, when the demand is low, a hydropower plant can reserve the water for future requirements. Hydropower can also supplement other forms of renewable energy such as wind or solar power.

WIND ENERGY

Wind energy uses the energy in the wind for practical purposes like generating electricity, charging batteries, pumping water, or grinding grain. Wind turbines convert the kinetic energy of the wind into other forms of energy. Large, modern wind turbines operate

together in wind farms to produce electricity for utilities. Small turbines are used by homeowners and remote villages to help meet energy needs.

BIOFUELS

Unlike other renewable energy sources, a variety of plant material can be converted directly into liquid fuels, called "biofuels," to help meet transportation fuel and other energy needs. Governor Rells's Connecticut's Energy Vision calls for a significant investment in the development and production of biofuels in Connecticut and its use as an energy resource in the State. Biofuels can be made from recycled cooking greases and oils, or directly from plant materials with high oil content, such as rapeseed or soy. Research is also being done on the feasibility of deriving biofuels from algae. Biodiesel usually refers to biofuels used either exclusively or as an additive to petroleum-based fuels, particularly in transportation fuels.. The same fuel when used as an alternative for or an additive to home heating oil is called bioheat. The use of both types of biofuels has tremendous potential in Connecticut.

ETHANOL

Ethanol is an alcohol made by fermenting any biomass material high in carbohydrates through a process similar to beer brewing. Today, ethanol is made from starches and sugars, but technology is being developed to allow it to be made from cellulose and hemicellulose materials, the fibrous material that makes up the bulk of most plant matter. Ethanol is mostly used as a fuel additive for vehicles to increase octane and cut down carbon monoxide and other smog-causing emissions.

Ethanol is a clean burning high octane fuel. Because it is domestically produced, ethanol can help reduce America's dependence upon foreign sources of energy. While ethanol is being promoted on the national levels, the Department of Environmental Protection has expressed some concerns about its long-term use in Connecticut.

HYBRID CARS

Basically, a hybrid vehicle combines an internal combustion engine and a motor powered by batteries, merging the best features of today's combustion engine cars and electric vehicles. The combination allows the electric motor and batteries to help the conventional engine operate more efficiently, cutting down on fuel use and helping with emissions. Meanwhile, the gasoline-fueled combustion engine overcomes the limited driving range of an electric vehicle. In the end, this hybridization gives you the ability to drive 500 miles or more using less fuel and never having to plug in for recharging. Gasoline-fueled hybrid electric vehicles are among a select few vehicle technologies that can provide dramatically increased fuel economy and extremely low levels of smog-forming and cancer causing emissions, while delivering the safety and performance the public has come to expect. Much of the success in achieving these goals however depends on how well automakers apply the technology. Some hybrids can achieve up to twice the fuel economy of a conventional car and produce 30 to 50 percent fewer greenhouse gas

emissions. While more and more automobile companies are offering hybrid vehicles, not all automobiles with the hybrid label actually achieve better mileage.

NATURAL GAS VEHICLES

Natural gas is best known as the fuel that heats our homes, cooks our food, and in some cases, produces our electricity. Natural gas is also successfully being used today in cars, trucks, and buses as a cleaner fuel alternative to diesel and gasoline. Compared to conventional diesel and gasoline, natural gas results in less tailpipe pollution and reduces oil dependence.

Fleet vehicles in areas with air quality concerns offer the most promise for natural gas vehicle technology. The benefits of natural gas vehicles (NGVs) are most pronounced in congested urban areas that have air quality concerns, and federal, state and local organizations have recognized the potential benefits of NGVs in these areas.

A number of factors make fleet vehicles — buses, taxis, delivery vehicles — the prime target for natural gas. Because natural gas generally costs less than gasoline, these high-mileage vehicles can realize large savings in fuel costs. Also, fleet vehicles tend to be centrally located. Thus, fleets can locate near refueling stations, or they can install their own facility.

PLAN FOR MOVING FORWARD

Governor Rell, in her *Connecticut's Energy Vision*, has set a goal of 20% of all energy used in the state will come from clean and renewable resources by 2020. State government plays an important part in achieving this ambitious target. The Governor has recognized that state government is a significant consumer of energy and has a responsibility to provide leadership in the use of renewable energy resources.

Connecticut's Energy Vision includes a similar target of increasing the use of renewable energy resources within state government to 20% by 2020. In order to achieve this goal, a consistent and comprehensive approach to developing and implementing renewable energy projects at state facilities will be necessary.

A basic outline for such a comprehensive approach should include the following key steps:

1. Conduct an inventory of existing renewable usage in state government
2. Establish interim targets to be achieved and identify the financial resources needed to achieve these targets
3. Identify and evaluate potential projects
4. Implement specific renewable projects or initiatives

Step 1: Inventory of existing renewable technology usage

As with any goal, knowing where you are starting at is important in determining where you end up. It is known that renewable energy technologies are currently being used by state agencies. What is unknown is the extent to which these technologies have been implemented and what contribution they make to the overall state's energy supply picture. Without knowing where we are starting at, it is nearly impossible to tell how far we may need to go in order to achieve the Governor's 20% goal.

The first step in this implementation plan will be to conduct a comprehensive inventory of the renewable energy resources that are currently being used in state buildings and in meeting its transportation fuel needs. This inventory will identify the specific technologies in place and the amount of energy they are contributing to the facility of agency's total energy consumption.

Step 2: Set interim targets

Once the inventory has been completed, interim targets can be set that will achieve the 20% goal by 2020. Part of this analysis will be to determine what mix of resources we potentially will want to use and estimate any cost impacts, both capital and operating costs. It will also be important to identify the share of the 20% goal that will be allocated to energy associated with state buildings and the share to be targeted for transportation energy uses.

Step 3: Identify and evaluate projects

Not all renewable energy technologies are suitable for all potential uses. Specific projects that meet the established targets will need to be identified. At this point, all viable options will be evaluated in order to determine the most cost effective options available for project development. There are possibilities where the capital costs associated with a renewable project may be significantly reduced, by leveraging the State's capital dollars with funding available from other sources. There will be a need for technical consultants to assist the OPM staff and the agency staff with project identification and evaluation.

Step 4: Implementation of specific projects

Once specific projects have been identified, including all funding opportunities, projects can move to the implementation stage. The bulk of the work at this point would shift to the host agency and/or DPW for project construction and completion. OPM would retain general oversight responsibilities to ensure that the project implementation proceeds on schedule and that the energy policy goals are maintained throughout the process. Post-installation evaluation will be a requirement of all renewable energy projects undertaken. This will ensure that performance criteria are in fact met by the project.

It is expected that Steps 3 and 4 would be repeated as necessary until such time that the Governor's goals have been achieved. It is also anticipated that Steps 1 and 2 can be undertaken, and perhaps accomplished, during the remainder of this fiscal year given the resources currently available to the Energy Policy Unit.

Immediate Action Steps

While it is recommended that the above general process be established, there are some immediate actions that could be undertaken to assist in achieving the Governor's policy objectives. Some of these actions will require little capital funding, although there would likely be an operating budget impact.

A. Clean Energy Option

In an effort to further general renewable policy goals, the DPUC has authorized a "clean energy option" to the standard offer service available to electric consumers. Under the Clean Energy Option, a customer can purchase 50% or 100% of their electric requirements from renewable resources simply by enrolling in the program. Customers are charged a premium on their electric bill for this service. Since the State is an electric consumer, this option is available to us as well. OPM has already established this option within state agencies. At the present time, both DEP and DPUC facilities are participating in the Clean Energy Option. It is recommended that we increase participation in this program by enrolling "high profile" state buildings, such as the State Capitol, Legislative Office Building, and others in the program.

B. Electric Generation Procurement

OPM has responsibility for operating a “state purchasing pool” for the electric requirements of state operations. As a result of the recent increases in price for generation services under the utility’s standard service, there is an opportunity for the state to achieve cost savings by securing a third-party electric generation provider. The Energy Policy Unit anticipates beginning the Request for Proposal (RFP) process this fiscal year. As part of this process, we may require that a certain percentage of our electric generation purchase be from renewable energy resources.

C. Bioheat/Biodiesel Mandate

The state is a significant user of petroleum products, both in terms of heating oil and diesel fuel. As part of the upcoming procurement process for heating oil for state facilities, a requirement that a certain percentage be comprised of biofuels could be established. Similarly, the current initiative undertaken by DOT in their use of biodiesel as a fuel for their vehicles could be expanded relatively quickly.

It is recommended that OPM move ahead with implementing the strategies outlined above, both in terms of establishing a more comprehensive plan for achieving the Governor’s renewable energy goals, and in terms of providing immediate actions that can demonstrate the viability and ease with which renewable energy can be incorporated into a diverse energy supply portfolio.

Alternative Compliance



Guidelines for Preparing and Submitting a Waiver Request and Other Documentation Requirements

10 CFR Part 490 Subpart I

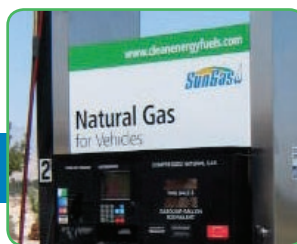


U.S. Department of Energy

Energy Efficiency and Renewable Energy

Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable

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Introduction

On March 20, 2007, the U.S. Department of Energy (DOE) issued a final rule in the Federal Register (FR 12958) on Alternative Compliance. This rulemaking offers state and alternative fuel provider fleets a new option to comply with the requirements of the Alternative Fuel Transportation Program (10 CFR Part 490). Alternative Compliance (Subpart I) sets forth procedures for covered fleets to obtain waivers from the alternative fuel vehicle (AFV) acquisition requirements of Standard Compliance (Subparts C and D) and to instead meet petroleum reduction requirements.

To qualify for an Alternative Compliance waiver, a covered state or alternative fuel provider fleet must demonstrate an annual petroleum reduction equal to the amount of petroleum it would have reduced if the fleet's required AFVs acquired in earlier years and other AFVs for which a waiver is requested operated on alternative fuel 100% of the time. The petroleum reduction plan must include calculations showing the average annual amount of gasoline gallon equivalents (GGE) consumed in the



istockphoto/Shawn Lowe

fleet's covered light-duty vehicles (LDVs). All data submitted by fleets must be verifiable, and participating fleets must submit an annual report certifying that their petroleum reductions actually were met during the Alternative Compliance year. Fleets must keep records backing up these claims for a minimum of three years.

The purpose of this document is to outline the Alternative Compliance option. In addition to offering an overview of the option, it addresses the following aspects of Alternative Compliance.

- Overview of Alternative Compliance and Eligibility
- Advantages of Alternative Compliance
- Participation Requirements
- Intent to Apply for a Waiver
- Waiver Request Procedure
- Elements of a Waiver Request

GLOSSARY

Alternative Compliance

This new option offers covered state and alternative fuel provider fleets the choice of obtaining a waiver from the AFV acquisition requirements of Standard Compliance by implementing petroleum reduction measures in their vehicles.

Standard Compliance

This term refers to the AFV acquisition requirements placed on state (75% of covered LDVs) and alternative fuel provider (90% of covered LDVs) fleets under the Alternative Fuel Transportation Program (10 CFR Part 490 Subparts C and D, respectively).

Alternative Fuel Vehicle

The Energy Policy Act (EPA) defines AFVs to include any dedicated, flexible-fuel or dual-fuel vehicles designed to operate on at least one alternative fuel. Fuels defined by EPA as alternative fuels are:

- Methanol, ethanol, and other alcohols
- Blends of 85% or more of alcohol with gasoline
- Natural gas and liquid fuels domestically produced from natural gas
- Liquefied petroleum gas (propane)
- Coal-derived liquid fuels
- Hydrogen
- Electricity
- Biodiesel (B100)*
- Fuels (other than alcohol) derived from biological materials
- P-Series

* In January 2001, the Biodiesel Final Rule (www.eere.energy.gov/afdc/pdfs/FedRegBioFinal.pdf) made it possible for fleets to earn EPA credits for use of biodiesel blends of at least 20%. This rule does not make B20 (a 20% blend of biodiesel with diesel) an alternative fuel, but gives one credit for every 450 gallons of pure biodiesel used in biodiesel blends.



Keith Wipke, NREL

- DOE Waiver Approval Process
- Implementation of Petroleum Reduction Plan
- Annual Report
- Timeline
- Use of Previously Earned Subpart F Credits
- Roll over of Excess Petroleum Reduction
- Exemptions
- Enforcement Authority
- Records Retention
- Appeals

In conjunction with this guidance document, an online interactive planning tool was developed (www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/) to help fleets calculate the petroleum reduction requirement and petroleum savings from fleet-specific strategies.

GLOSSARY

Fleet

This term refers to state entities or alternative fuel providers covered under the Alternative Fuel Transportation Program (10 CFR Part 490).

Alternative Compliance Vehicle

This term refers to a vehicle (or required AFV) that must be included in calculating a fleet's petroleum reduction requirement under the Alternative Compliance option. ACVs are:

- *AFVs acquired in previous model years* in compliance with the Standard Compliance requirements (minus retirements)
- *LDVs (conventional or AFV) planned to be acquired in the upcoming waiver model year* instead of the AFV requirements that otherwise would be met under the Standard Compliance requirements
- *LDVs (conventional or AFV) acquired in previous waiver model years* instead of the AFV requirements that would otherwise be met under the Standard Compliance requirements (minus retirements)

Alternative Compliance Vehicle Inventory

This term refers to the total number of ACVs in a fleet for the upcoming waiver model year. ACVs retired from the fleet prior to the start of the model year are not included in the ACV inventory.

Alternative Compliance Overview

Subpart I offers covered state and alternative fuel provider fleets (hereafter referred to as "fleets") an option to implement petroleum reduction measures in lieu of the Standard Compliance AFV acquisition requirements.

To participate in the Alternative Compliance option for a model year, fleets must obtain a waiver from DOE. This requires the fleet to collect and submit, at a minimum, data on its fleet's AFVs acquired to comply with the Standard Compliance requirements, all LDVs (including light-duty AFVs) acquired in lieu of waived AFVs under the Alternative Compliance option, average fuel use of the covered light-duty fleet, and any alternative fuel used.

In addition, the fleet must:

- Determine its **alternative compliance vehicle (ACV) inventory**. The total number of ACVs in a fleet is the ACV inventory for that model year. Vehicles retired from the fleet prior to the start of the model year are not included in the ACV inventory (to see what this includes, read the definition in adjacent box)
- Provide either the **average annual amount of fuel in GGE consumed in its covered LDVs** or a reasonable estimate of this value, and explain the methodology used to derive the amount
- **Develop and submit to DOE a petroleum reduction plan** that details the amount of petroleum it will reduce
- **Document the actual petroleum reduction** following completion of the Alternative Compliance year

Details on each of these components are included in this document. If a fleet is unsure of its ability to provide

data of sufficient quality and detail to verify its petroleum reductions, then Alternative Compliance may not be an appropriate option. Examples of documents to verify petroleum reductions include:

- Retail fuel purchase receipts
- Bulk fuel-use purchase/delivery records (for fleets with their own refueling sites)
- Fuel-use/purchase logs maintained by vehicle operators

The Standard Compliance requirements and the Alternative Compliance options are both acceptable methods for fleets to use to comply with DOE fleet requirements. A fleet must comply entirely with one of these for a full model year for its entire fleet. For participation in the Alternative Compliance option, DOE approval is required annually.

Advantages of Alternative Compliance

Alternative Compliance offers more flexibility in complying with annual requirements. For some fleets, alternative fuels and/or AFVs are unavailable. Therefore, some of these fleets should pursue petroleum reduction. Subpart I allows these fleets to pursue various options, including purchasing hybrids and other advanced technology vehicles, increasing fleet fuel efficiency, pursuing higher levels of fuel blends, and reducing vehicle miles traveled (VMT).

Unlike Standard Compliance, Alternative Compliance allows petroleum reductions to be counted toward compliance with annual requirements in a variety of vehicle types. Subpart I allows participating fleets to count petroleum reduction contributions made by vehicles with more than 8,500 lbs. gross vehicle weight rating (GVWR), excluded LDVs, and limited numbers of qualified non-road vehicles.

Participation Requirements

Subparts C and D of Part 490 establish requirements for certain fleets to acquire set percentages of AFVs. Subpart I allows DOE to grant waivers to fleets that show they can reduce petroleum by the amount of alternative fuel they would have used notwithstanding the waiver if alternative fuels were used in all required AFVs.

As under the Standard Compliance requirements, fleets can participate as a group (e.g., several state agencies) under the Alternative Compliance option. However, unlike the Standard Compliance requirements, grouped



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fleets in the Alternative Compliance option may not change their grouping once it is established. That is, a group established during one model year must remain the same in all subsequent years under Alternative Compliance. If the fleets revert to the Standard Compliance requirements, they may change their fleet grouping.

Each fleet wishing to participate in Alternative Compliance must submit to DOE in writing its intent to apply for a waiver by March 31* of the model year preceding the applicable model year for which the waiver is sought (fleets will be able to submit this electronically on the EPA's Web site). A waiver request is good for a single model year, which runs from September 1 through August 31. The 2009 model year is September 1, 2008, to August 31, 2009. The intent to apply for a waiver for model year 2009, for example, must be received by DOE no later than March 31, 2008. The actual detailed waiver request is due to DOE no later than June 30 or July 31, depending on the type of request. (See the Timeline section for more specific information.)

The detailed waiver request must include a required petroleum reduction amount (as calculated by the fleet) and a detailed plan for achieving that reduction. The plan allows a fleet to meet its petroleum reduction requirement using on-road light-, medium- or heavy-duty vehicles and, to a limited extent, certain qualified non-road vehicles. A fleet may include any number or combination of petroleum reduction approaches in these vehicles, such as:

- Alternative fuels in AFVs (for a list of qualified alternative fuels see the box on page 1).
- Hybrid vehicles or other energy-efficient vehicles
- Fuel blends (biodiesel/diesel)

* For model year 2008 only, fleets will be allowed to submit their intent to apply for a waiver by May 31, 2007.

- Fuel economy measures
- Idle reduction
- Replacement fuel used in qualified non-road vehicles

See Appendices E and F for details on calculating these methods.

DOE will review the waiver request to determine if it appropriately estimates the petroleum reduction requirement and presents a reasonable and verifiable approach to reducing petroleum. If DOE has questions, it may contact the fleet for additional data or clarification. DOE will inform the fleet whether the waiver request was approved or rejected. As previously indicated, a waiver request must be submitted before each model year for which the waiver is being sought.

While under a waiver for a particular model year, the fleet implements the petroleum reduction plan and measures its petroleum use. After the end of the model year, the fleet submits a report to DOE that includes actual fleet petroleum use data. This report is due by December 31 following the end of the subject model year.

Intent to Apply for a Waiver

To submit an intent to apply for a waiver, fleets should register their preliminary intent by March 31* preceding the model year for which the waiver is sought. Intent to apply for a waiver should include the following information:

- Name and address of the reporting fleet
- Fleet ID number
- Name and contact information for the point of contact for the fleet
- Model year for which the waiver is requested
- A list of all included fleets

A detailed checklist of the required information is supplied in Appendix C. In addition, information on submitting an intent to apply for a waiver online is available on the EPA's Web site at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/waiver_app0.cgi.

Waiver Request Procedure

To participate in the Alternative Compliance option, fleets must develop a waiver request that must be approved by DOE. The waiver request must be applicable for the entire fleet for the full model year and include:



Comstock



Steps to Alternative Compliance

Submit intent to apply for a waiver* request to DOE by March 31 preceding the model year for which the waiver is being requested.

Submit detailed waiver request to DOE by June 30 or July 31 (depending on the type of request) preceding the model year for which the waiver is sought. The request must include:

- A required petroleum reduction amount based on the fleet's current ACV inventory and average-per-LDV fuel use
- A detailed plan for achieving that reduction requirement

Implement the petroleum reduction plan over the course of the model year.

Submit a compliance report to DOE by December 31 following the model year for which the waiver was granted. This report must document the fleet's actual petroleum use data for all vehicles included in the plan for that model year.

* For model year 2008 only, fleets will be allowed to submit their intent to apply for a waiver by May 31, 2007.



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- A petroleum reduction requirement calculation for the waiver model year
- A petroleum reduction plan to meet the calculated requirement

Information on how to develop a waiver request is outlined in Appendices E and F.

► **In addition**, an interactive planning tool to assist fleets in making the calculations necessary to complete a formal waiver request is available online at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/. This automated tool helps users determine their annual petroleum reduction requirement and allows fleets to generate plans based on a variety of fuel displacement methods. The tool offers side-by-side comparisons of petroleum reduction methods to help fleets decide which combination will be most effective in their specific circumstances.

Step 1: Calculate the Petroleum Reduction Requirement

Each participating fleet must estimate the amount of petroleum it is required to reduce in the model year for which the waiver is sought. This amount is based on the fleet's inventory of ACVs during the waiver model year. As described in the box on page 2, the ACV inventory is comprised of the following three components:

- **AFVs acquired in previous model years** to comply with the Standard Compliance requirements. AFVs not included in this category are:
 - AFVs acquired but not used to comply with the Standard Compliance requirements
 - AFVs acquired above the number necessary to meet the requirement for that year (resulting in banked credits)

- AFVs retired prior to the start of the waiver model year
- **LDVs (conventional or AFV) planned to be acquired in the upcoming waiver model year** instead of the AFV requirements that otherwise would be met under the Standard Compliance requirements. This is determined in the same way it is for the Standard Compliance requirements
- LDVs (conventional or AFV) acquired in previous waiver model years instead of the AFV requirements that otherwise would be met under the Standard Compliance requirements, minus retirements

Fleets can access and submit information on the vehicles included in their ACV inventory at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi.

The total number of these vehicles is the fleet's ACV inventory for the Alternative Compliance model year. The ACV inventory is multiplied by the average amount of fuel these ACVs are estimated to use during the waiver model year, and this value is the fleet's estimated **petroleum reduction requirement**.

To determine the average amount of fuel use per vehicle, DOE will either accept fuel-use data collected from covered LDVs or allow applicants to submit estimates based on reasonable methodologies, such as extrapolating fuel use from actual mileage data and published fuel economy values. A fleet may also use general fleet or industry statistics, along with a sampling of its fleet if it is large. DOE will consider requests regarding statistical methodology for the first year of a waiver but may require the applicant to improve its data collection efforts to encompass the entire covered portion of its fleet in future years. Actual data collection measurements will be necessary for all fleets to verify their actual petroleum reductions versus the estimates in their waiver calculations. Fleets lacking a way to demonstrate actual petroleum reductions should not apply for waivers.

After an average-fuel-use-per-LDV value is developed for a fleet's first year of Alternative Compliance, this value is used for the calculation of a fleet's requirement under Alternative Compliance in all subsequent years. DOE will consider adjusting the average-fuel-use-per-LDV value if a fleet submits a rationale to change it. To avoid double-counting petroleum savings, changes to this value cannot be made due to petroleum reduction measures (including fuel economy improvements such as buying HEVs or reducing VMT) in previous Alternative Compliance years.

Tracking LDV Acquisitions and Retired Vehicles

To ensure accurate tracking of actual acquisitions and retirements, fleets with waivers should electronically submit identifying information for all ACVs in their inventories during Alternative Compliance years. Submitted data will be similar to those required for AFVs reported under the Standard Compliance requirements on Form DOE/FCVT/101 (www.eere.energy.gov/vehiclesandfuels/epact/docs/fleet_report_05_2004.xls). Figure 1 provides an example of a fleet's estimated petroleum reduction requirement over several years of participation in the Alternative Compliance option and shows how new covered vehicle acquisitions and retired vehicles affect the ACV inventory on an annual basis.

Fleets will need to consider when they will retire vehicles when calculating their petroleum reduction requirement for an Alternative Compliance waiver (due in June or July prior to the model year). For calculation purposes, vehicles in the fleet at the beginning of the model year (September 1) will be considered part of the fleet for the entire model year, even if they are retired over the course of the year.

Planned vehicle retirements that do not take place should be reflected on the fleet's annual report submitted to DOE following the model year. This change in retirement status will likely affect the fleet's petroleum reduction requirement, and this impact should be noted in the annual report as well. For example, a fleet that retires five AFVs instead of 15 prior to the waiver model year will need to reduce petroleum consumption by an additional 5,000 GGE (assuming the fleet's average annual fuel use is 500 GGE per vehicle). This is because these vehicles should be included in the ACV inventory, which forms the basis for calculating the petroleum reduction amount. This amount is in addition to the amount calculated on the fleet's waiver submission to DOE.

Likewise, LDVs acquired any time during the model year are included as acquisitions for the entire year and should therefore be included in the ACV inventory.

Tracking ACVs

As explained earlier, fleets are asked to submit data on LDVs that are part of the ACV inventory and acquired during an Alternative Compliance year. The fleet should enter the necessary information annually online and include vehicle make and model and vehicle identification number (VIN). The data should be entered by the fleet on the EPA Web site at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi.



Figure 1 illustrates how the calculation accounts for year-to-year changes in the fleet's composition and GGE requirements. In the first year, the fleet's ACV inventory includes:

- The number of required AFVs previously acquired and reported to DOE (the AFVs acquired in compliance with and under Subparts C and D) that are still part of the fleet at the beginning of the waiver model year; and
- The number of AFVs the fleet would have been required to acquire during the waiver model year if still under the Standard Compliance requirements

The vehicles actually acquired in lieu of meeting the waiver year AFV requirement could be petroleum-fueled LDVs or AFVs (if AFVs were acquired as part of the fleet's fuel reduction strategy). Identifying information on each of the ACVs in the fleet's ACV inventory must be submitted online (www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi) so retirements of these vehicles can be tracked by DOE and fleets in the future.

Vehicles that are part of the ACV inventory (pre-waiver AFVs and covered LDVs acquired during Alternative Compliance years) are counted, even if they are retired during a waiver year, but not in the years following the retirement. Figure 1 shows how the inventory changes with new ACVs entering the fleet taking the place of those that are retired.

Note that though Figure 1 spans multiple years, a waiver request covers only one year. Although waiver requests are annual, fleets must submit data that accurately depict the actual required AFVs existing in the fleet, plus the fleet's annual requirements on a cumulative basis. Figure 1 demonstrates this process and shows how the waiver request should include requirements accumulated from previously granted waivers, as well as required AFVs existing in the fleet that were accumulated prior to an initial waiver. It also demonstrates how retired vehicles and requirements from previous Alternative Compliance years are subtracted.

» Figure 1

Example of an Estimated Petroleum Reduction Requirement for an Alternative Fuel Provider Fleet

Year 1 (The first year the fleet is applying for a waiver)

- 25 pre-waiver required AFVs in the fleet previously reported to DOE in an annual report (DOE/FCVT/101) and still in the fleet
- 9 requirements (90% of 10 planned LDV acquisitions)*
- ACV Inventory: 34 ($25 + 9 = 34$)
- Average annual fuel use per LDV: 500 GGE
- Petroleum reduction requirement amount: 17,000 GGE ($500 \text{ GGE} \times 34 \text{ vehicles}$)

Year 2

- 15 pre-waiver required AFVs remaining in the fleet (10 were retired and no longer included)
- 9 requirements (90% of 10 planned LDV acquisitions for Year 2)*
- 9 requirements in the first year
- ACV Inventory: 33 ($15 + 9 + 9 = 33$)
- Average annual fuel use per LDV: 500 GGE
- Petroleum reduction requirement amount: 16,500 GGE ($500 \text{ GGE} \times 33 \text{ AFVs}$)

Year 3

- 5 pre-waiver required AFVs in the fleet (10 more were retired from the previous year)
- 9 requirements (90% of planned 10 LDV acquisitions in Year 3)*
- 18 requirements from previous two Alternative Compliance years (9 from first year plus 9 from second year)
- ACV Inventory: 32 ($5 + 9 + 9 + 9 = 32$)
- Average annual fuel use per LDV: 500 GGE
- Petroleum reduction requirement amount: 16,000 GGE ($500 \text{ GGE} \times 32 \text{ AFVs}$)

Year 4

- 0 pre-waiver required AFVs in the fleet (remaining 5 were retired)
- 9 requirements (90% of 10 planned LDV acquisitions in Year 4)*
- 27 requirements from previous three Alternative Compliance years (9 each from Years 1, 2, and 3)
- ACV Inventory: 36 ($9 + 9 + 9 + 9 = 36$)
- Average annual alternative fuel use per AFV: 500 GGE
- Petroleum reduction requirement amount: 18,000 GGE ($500 \text{ GGE} \times 36 \text{ AFVs}$)

Year 5

- 0 pre-waiver required AFVs
- 9 requirements (90% of 10 planned LDV acquisitions in Year 5)*
- 27 requirements from previous three Alternative Compliance years (9 each from years 2, 3 and 4)
- 9 LDV retirements from Year 1
- ACV Inventory: 36 ($9 + 9 + 9 + 9 = 36$)
- Average annual alternative fuel use per AFV: 500 GGE
- Petroleum reduction requirement amount: 18,000 GGE ($500 \text{ GGE} \times 36 \text{ AFVs}$)

**Identifying data on LDVs representing requirements acquired during a waiver year should be reported in the online ACV inventory. Fleets can access and submit information on the vehicles included in their ACV inventory at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi.*

Step 2: Develop a Plan for Achieving the Annual Petroleum Reduction Requirement

After the annual petroleum reduction requirement is calculated, the fleet must develop a plan for reducing this amount of petroleum use. For this, the fleet needs to examine its composition and determine where petroleum savings may be achieved most easily.

Fleets can reduce petroleum through a number of strategies. Examples include:

- Alternative fuel or fuel-efficient technologies in any size on-road vehicle, including light-, medium-, and heavy-duty vehicles
- Biodiesel blends in diesel vehicles (only the biodiesel portion of the blend counts toward compliance)
- Hybrid or other fuel-efficient vehicles instead of low-mpg vehicles
- Replacement fuels in some qualified non-road vehicles if the acquisition of these vehicles leads directly to the establishment or upgrading of refueling or recharging infrastructure for expanded alternative fuel use by the fleet's light-duty AFVs
- Fleet management practices that result in reduced VMT

Reductions in petroleum use must be:

- Attributable to motor vehicles or limited numbers of qualified non-road vehicles owned, operated, leased, or otherwise under the control of the proposing fleet
- Demonstrated through the annual waiver request and annual reporting submissions
- Based on verifiable data sufficient for DOE to determine whether the petroleum reductions are achievable

Petroleum reductions must **not** include reductions attributable to:

- Reduction of petroleum use by third parties
- Non-qualified non-road vehicles

Non-Road Vehicles

DOE's final rule permits fleets to use petroleum reductions from non-road vehicles if certain requirements are met. The fleet must first show that the acquisition of these non-road vehicles leads directly to the establishment or upgrading of alternative refueling or recharging infrastructure during an Alternative Compliance year that

would also allow for increased petroleum replacement by serving the fleet's on-road LDVs. Where documented evidence of investments in refueling infrastructure can be established, a fleet may request that up to 25% of its total petroleum reduction requirement be met by using non-road vehicles that operate on alternative fuel. This may apply to that Alternative Compliance model year and to future model years when the new or upgraded refueling infrastructure can be shown it will also be used to service the fleet's on-road LDVs.

If the covered fleet finds it necessary to include more than 25% of its petroleum reduction requirement from non-road vehicles, it should demonstrate that technologies for additional petroleum reduction in the fleet's on-road vehicles are not reasonably available. DOE will base determinations of "reasonable availability" on market information and data presented by the fleet that show the lack of availability of vehicle technologies, replacement fuels, energy-efficient products, and fleet management practices that could make a reduction in fuel use in the on-road fleet.



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Elements of a Waiver Request

The waiver request must include sufficient and verifiable data to enable DOE to evaluate whether the fleet's strategy is likely to achieve the necessary petroleum reductions. DOE may request additional documentation to supplement the waiver request.

- **Information about the proposing fleet** (name, address, point of contact information, and name and title of responsible official)
- **Model year for which the waiver is requested**
- **Petroleum reduction requirement**, based on:
 - Total ACV inventory and the details on how this value was developed
 - Average per LDV fuel use (in GGE) in covered fleet LDVs
- **Petroleum reduction plan** that details the intended strategies and the petroleum reduction amount anticipated from each approach. As previously discussed, the plan must include the petroleum reduction requirement (and how it was calculated) and details on how each intended strategy contributes toward reaching this amount
- Certification by a senior official that the proposing fleet is in compliance with all applicable vehicle emission standards by the administrator of the U.S. Environmental Protection Agency (EPA) under the Clean Air Act

A checklist of documents and other information required in a waiver request is included in Appendix C. All waiver requests must be submitted on letterhead, signed, and mailed along with two copies to the address at right by June 30 or July 31, as appropriate. To ensure DOE receives your request in a timely manner, a copy should also be e-mailed to the Alternative Fuel Transportation Program's Regulatory Manager. If you have questions about the waiver process, contact DOE at 202-586-9171, linda.bluestein@ee.doe.gov.

DOE Waiver Approval Process

Once DOE receives complete information and data, it has 45 business days to issue a written decision. Requesting entities should provide information and data as early as possible to allow adequate time for fleet planning if they are denied a waiver. If DOE determines the information provided is not sufficient to process the request, it will notify the fleet and indicate the type of information that should be submitted. The 45-day review period



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starts from the time DOE has all the information it needs to conduct the review. Therefore, if DOE requests additional information, the 45-day review period will start at the date of receipt of the additional information.

Implementation of Petroleum Reduction Plan

During the waiver model year the fleet implements the various elements of the DOE-approved petroleum reduction plan. During this period the fleet should carefully track and keep records on the acquisition of alternative fuel and advanced technology vehicles, alternative fuel use, fuel economy measures, and other data to ensure accurate reporting on the success and impact of each component of the plan.

Annual Report

By December 31 following each model year, a waived fleet must submit to DOE an annual report certifying the actual amount of petroleum motor fuel it reduced during the Alternative Compliance year and explain how the data were collected. DOE may request additional



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documentation, such as purchase orders, receipts, fuel use records, and detailed vehicle inventories, when necessary, to supplement the report.

The annual report must be sent to DOE on company letterhead and signed by a senior official. This information must be received by DOE before December 31, or it will be considered a violation of the requirements of the Alternative Fuel Transportation Program (10 CFR Part 490).

Timeline

Entities wishing to submit a waiver proposal to DOE must submit information as follows.

- Prior to the start of the model year (which runs September 1 through August 31):
 - March 31*: Deadline for submitting an intent to apply for a waiver to DOE
 - June 30: Deadline for submitting a waiver request to DOE if the application is not dependent on information concerning the availability of new model year vehicles from auto manufacturers
 - July 31: Deadline for submitting waiver request to DOE if the request is dependent on information concerning the availability of new model year vehicles from auto manufacturers
- After the end of the model year:
 - December 31: Deadline for submitting an annual report certifying the petroleum reduction achieved.

Fleets should electronically supply information (at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi) for tracking acquisitions and retirements of LDVs acquired during years when waivers were in force.

Use of Previously Earned Subpart F Credits

DOE recognizes that in a given Alternative Compliance model year, participating fleets may not achieve actual petroleum reductions equal to the required amount. To avoid imposing a penalty on a fleet that in good faith implemented its petroleum reduction plan, DOE will allow application of banked credits and may allow a fleet to purchase AFV acquisition credits (see 10 CFR Part 490 Subpart F) to make up for the fleet's shortfall.

If a fleet needs to rely on credits to account for a shortfall in its actual petroleum reduction, the fleet is required to submit a written request to DOE at the end of the Alternative Compliance model year. The request must detail the particular circumstances that led to the shortfall. DOE will respond with a credit amount based on the fleet's historical fuel use data. DOE may ask for additional fuel use information from the fleet, if necessary, to make its determination. For example, if a fleet typically uses 500 GGE per year in each of its LDVs and comes up 5,000 GGE short in its petroleum reduction requirement, upon approval of DOE, it could use 10 AFV acquisition credits to make up the shortfall.

» Figure 2

Alternative Compliance Timeline

Prior to Start of Model Year						Model Year	After end of the Model Year				
Feb	Mar	Apr	May	Jun	Jul		Sep	Oct	Nov	Dec	
March 31*		June 30				September 1 through August 31	December 31				
Deadline for registering intent to apply for a waiver with DOE		Deadline for submitting waiver request to DOE if the application is not dependent upon the availability of new model vehicles from manufacturers					Annual report deadline for submitting documentation on actual petroleum reduced during the Alternative Compliance year				
July 31											
Deadline for submitting waiver request to DOE if the application is dependent upon availability of vehicles from manufacturers											

* For model year 2008 only, fleets will be allowed to submit

* For model year 2008 only, fleets will be allowed to submit their intent to apply for a waiver by May 31, 2007.

Roll over of Excess Petroleum Reduction

To provide additional flexibility to fleets that over comply with the petroleum reduction requirements, DOE will allow limited petroleum reductions in excess of a fleet's requirement to be used in future model years. For example, if a fleet reduces petroleum use by 65,000 GGE but was only required under the terms of the waiver to reduce 60,000 GGE, the excess of 5,000 GGE may be rolled over to help satisfy future annual petroleum reduction requirements. Fleets should note that accumulated roll-over amounts cannot be traded to other fleets, nor can they be converted back to AFV acquisition credits if a fleet returns to the Standard Compliance requirements. These roll-over amounts, however, do serve as a type of insurance against future shortfalls under the Alternative Compliance option.

To apply roll-over amounts to a petroleum reduction shortfall, the fleet must specifically make such a request in writing to DOE. DOE will typically allow the application of roll-over amounts only in circumstances beyond a fleet's control (e.g., technology failures, excessive vehicle delivery delays, weather-related disasters, emergencies, or other serious or highly unusual circumstances as determined by DOE). In general, DOE will not approve application of roll-over amounts greater than 25% of a fleet's annual petroleum reduction requirement. In extreme cases, DOE may consider allowing application of a higher percentage but only where a fleet makes a clear and convincing case that it had no other available option for achieving the required petroleum reduction requirement during that model year.

Exemptions

The exemption provisions incorporated under the Alternative Fuel Transportation Program (10 CFR Part 490) are specific to the requirements of the Standard Compliance requirements. If a fleet requests and receives

a waiver instead of complying with the vehicle acquisition requirements, it may not request any exemptions to reduce its petroleum reduction requirements. Alternative Compliance provides an alternative means of compliance and flexibility. Exemptions are based on a lack of available alternative fuels and/or AFVs. Under Alternative Compliance, fleets can adopt multiple strategies for compliance aside from alternative fuels and AFVs. Therefore, fleets requesting waivers may not file for exemptions.

Enforcement Authority

Fleets are required to comply with the petroleum reduction requirements included in their waiver requests. If a fleet is found to have failed to provide the level of petroleum reduction indicated in its waiver grant response from DOE, DOE has authority to immediately revoke the waiver and require the fleet to make up for any shortfall in acquisitions through the purchase or use of credits. If necessary, DOE has authority to impose penalties as described in 10 CFR, Part 490, Section 490.604.

Records Retention

Fleets will be required to retain for a period of three years all necessary documentation needed to demonstrate compliance. Records include vehicle purchase receipts and vehicle inventory records (e.g. fuel purchase invoices and vehicle retirement dates). This requirement is consistent with the documentation requirements for Standard Compliance annual reporting (10 CFR 490.205 and 490.309).

Appeals

If a fleet's waiver request is rejected, the fleet may appeal the decision to the Office of Hearings and Appeals using the procedures set out in 10 CFR, 490.806(c). Appeals must be filed within 30 days of notification that DOE rejected a waiver request.



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Appendix A: Acronyms

2% biodiesel with 98% diesel fuel	B2
20% biodiesel with 80% diesel fuel	B20
85% ethanol, 15% petroleum	E85
100% biodiesel	B100
Alternative compliance vehicle	ACV
Alternative fuel vehicle	AFV
Auxiliary power unit	APU
Blend required	BR
Hundred cubic feet	CCF
Compressed natural gas	CNG
Conventional fuel	CF
Conventional fuel blend	CFB
Electric	Ele
Federal Automotive Statistical Tool	FAST
Fuel economy	FE
Gasoline gallon equivalent	GGE
Gross vehicle weight rating	GVWR
Heavy duty	HD
Heavy-duty vehicle	HDV
Hybrid electric vehicle	HEV
Hydrogen	H2
Idle reduction	IR
Light duty	LD
Light-duty vehicle	LDV
Liquefied natural gas	LNG
Liquefied petroleum gas	LPG
Lower heating value	LHV
Miles per gallon	mpg
Medium duty	MD
Medium-duty vehicle	MDV
Neighborhood electric vehicle	NEV
Pounds per square inch	PSI
Pounds per square inch absolute	PSIA
Sport utility vehicle	SUV
U.S. Department of Energy	DOE
U.S. Environmental Protection Agency	EPA
Vehicle miles traveled	VMT
Vehicle identification number	VIN

Wieck Photo Database

Appendix B: Frequently Asked Questions

Questions and answers are grouped in nine areas for easy access:

- General Interest
- Intent to Apply for a Waiver
- Waiver Requests
- AFV and Petroleum Reduction Credits
- Non-Road Vehicles
- Annual Compliance Report
- Over-Compliance and Under-Compliance
- Records and Appeals

General Interest

Q. What is Alternative Compliance?

A. Alternative Compliance (Subpart I) is an optional compliance method for state and alternative fuel provider fleets subject to the AFV acquisition requirements of the Alternative Fuel Transportation Program (10 CFR Part 490 Subparts C and D). This new option offers fleets the choice of obtaining a waiver from the AFV acquisition requirements of Subparts C and D (Standard Compliance) to implement petroleum reduction measures in their vehicle fleets.

Q. How do fleets qualify for the Alternative Compliance option?

A. To qualify for an Alternative Compliance waiver, a covered state or alternative fuel provider fleet must demonstrate an annual petroleum reduction equal to the amount of petroleum it would have reduced in the AFVs it would have acquired under Standard Compliance and in the AFVs for which a waiver is requested were operated on alternative fuel 100% of the time.

Q. What types of fleets should choose the Alternative Compliance option?

A. Although Alternative Compliance is available to all fleets, it is a good option for fleets in areas where alternative fuels or AFVs that meet their business needs are not readily available. The option allows fleets the flexibility to pursue other innovative approaches to reduce petroleum in lieu of acquiring AFVs. Options include purchasing hybrids, increasing fleet fuel efficiency, increasing the use of blends, and reducing VMT. Using alternative fuels in AFVs is also an option.

**For model year 2008 only, fleets will be allowed to submit their intent to apply for a waiver by May 31, 2007.*

Q. How do fleets participate in the Alternative Compliance option?

A. To participate in Alternative Compliance, fleets must first submit to DOE their intent to apply for a waiver by March 31* before the model year for which the waiver is sought. Next, fleets must submit a waiver request to DOE by June 30 if the application is not dependent on information concerning the availability of vehicles from auto manufacturers, or July 31 if the request is dependent on information concerning the availability of new model year vehicles from auto manufacturers. Finally, fleets must submit an annual report to DOE by December 31 after the model year for which a waiver was granted. This report must include the fleet's actual petroleum use data for all vehicles included in the plan for the Alternative Compliance model year.

Q. Can a fleet return to the Standard Compliance requirements after participating in the Alternative Compliance option?

A. Yes. However, excess reductions of petroleum use in the fleet under Alternative Compliance cannot be converted to credits and used under Standard Compliance (for more information, see page 11, Roll over of Excess Petroleum Reduction).

Q. Can fleets report as a grouped fleet?

A. Fleets can participate as a group (e.g., several state agencies) under the Alternative Compliance option. However, once a grouping is established, it may not be modified while under the Alternative Compliance option.

Q. What is an Alternative Compliance vehicle?

A. An ACV is a vehicle that is included in calculating a fleet's petroleum reduction requirement under the Alternative Compliance option. ACVs are:

- AFVs acquired in previous model years in compliance with the Standard Compliance requirements (minus retirements)
- LDVs (conventional or AFV) planned to be acquired in the upcoming waiver model year instead of the AFV requirements that otherwise would be met under the Standard Compliance requirements
- LDVs (conventional or AFV) acquired in previous waiver model years instead of the AFV requirements that otherwise would be met under the Standard Compliance.

Fleets can access and submit information on the vehicles included in their ACV inventory at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi.

Q. What is the Alternative Compliance vehicle inventory?

A. The fleet's ACV inventory consists of the total ACVs in a fleet for the upcoming waiver model year. ACVs retired from the fleet prior to the start of the model year are not included in the ACV inventory. Vehicles in the fleet at the start of the model year (i.e., September 1) will be considered part of the fleet for the entire model year, even if they are retired during the course of the model year. Fleets can access and submit information on the vehicles included in their ACV inventory at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi.

Q. How do fleets track their ACV inventories?

A. To track their ACV inventories, fleets with waivers should provide online (www.eere.energy.gov/vehicle-sandfuels/epact/state/acp_tool/view_acv.cgi) identifying information about LDVs (including both alternative and petroleum fueled) acquired during Alternative Compliance model years. Such details should include make, model, and VIN. With this information, fleets (and DOE) will be better able to track vehicles when they are retired.

Q. What if a fleet plans to retire a vehicle before the start of the model year but does not?

A. Planned vehicle retirements that do not take place should be reflected in the fleet's annual report submitted to DOE by December 31 following the end of the Alternative Compliance model year. This change in retirement status will likely affect the fleet's petroleum reduction requirement, and this impact should be noted in the annual report as well. In other words, if a fleet does not retire an AFV, this will increase the total ACV inventory and will increase the petroleum reduction amount for that waiver model year. For example, if a fuel provider fleet does not retire 10 vehicles as planned prior to the start of the waiver model year, the ACV inventory for that fleet for that waiver year will increase by nine (90% of 10 vehicles). If the average annual fuel use per LDV is 500 GGE, the petroleum reduction amount that the fleet needs to achieve in that waiver year will be 4,500 GGE higher than initially calculated.

Q. How are AFVs acquired beyond the requirements handled in the ACV inventory?

A. Any AFVs acquired by a fleet in excess of the requirements are not included in the ACV inventory. This includes AFVs acquired before 1997; AFVs acquired but not intended for compliance; and those acquired above the number necessary to meet the fleet's requirement for that year, resulting in banked credits under Standard Compliance.

Intent to Apply for a Waiver

Q. How is DOE notified of a fleet's intent to apply for a waiver?

A. Fleets must submit information online (at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/waiver_app0.cgi) by March 31* preceding the model year for which the waiver is sought.

Q. What must an intent to apply for a waiver include?

A. An intent must include:

- Name of fleet and information for the point of contact and responsible official
- Model year for which the waiver is requested
- A list of all included fleets

Waiver Requests

Q. What must a waiver request include?

A. Waiver requests must include a required petroleum reduction amount (as calculated by the fleet) and a detailed plan for achieving that reduction. The plan allows a fleet to meet its petroleum reduction requirement using on-road light-, medium- or heavy-duty vehicles, and to a limited extent certain qualified non-road vehicles. A fleet may include any number of petroleum reduction approaches in these vehicles in any combination, including alternative fuels in AFVs, biodiesel blends in diesel vehicles, hybrid vehicles or other energy efficient vehicles, and modified fleet management practices. The waiver request must be applicable for the entire fleet for the full model year.

Q. Do fleets need to have waiver requests signed by a senior official?

A. Yes. All waiver requests must be certified by a senior official to ensure the proposing fleet is in compliance with all applicable vehicle emission standards estab-

* For model year 2008 only, fleets will be allowed to submit their intent to apply for a waiver by May 31, 2007.

lished by the administrator of the EPA under the Clean Air Act.

Q. Where should fleets submit a waiver request?

A. All waiver requests must be submitted on letterhead, signed, and mailed with two copies to: Linda Bluestein, Regulatory Manager, U.S. Department of Energy, EE-2G/Forrestal Building, 1000 Independence Ave., S.W., Washington, DC 20585. To ensure DOE receives your request in a timely manner, it should also be e-mailed, if possible, to the Alternative Fuel Transportation Program's Regulatory Manager at linda.bluestein@ee.doe.gov.

Q. On what basis is a waiver request approved?

A. DOE will review the waiver request to determine if it appropriately estimates the petroleum reduction requirement and presents a reasonable and verifiable approach to reducing petroleum. If DOE has questions, it may contact the applicant for additional data or clarification. DOE will inform the applicant whether the waiver request was approved or rejected.

Q. How long does it take DOE to issue a waiver?

A. Once it receives complete information and data, DOE has 45 working days to issue a written decision. Requesting entities should provide information and data as early as possible to allow adequate time for fleet planning if they are denied a waiver. If DOE determines the information provided is not sufficient to process the request, it will notify the fleet and indicate the type of information that should be submitted. The 45-day review period starts from the time DOE has all the information it needs to conduct the review. Therefore, if DOE requests additional information, the 45-day review period will start at the date of receipt of the additional information.

Q. Do fleets have to submit waiver requests each year they want a waiver, or can they request a waiver for multiple years?

A. Fleets must submit a new waiver request each model year. This is necessary because conditions frequently change in businesses and agencies, and the annual updating of information ensures that better compliance and enforcement will be achieved.

AFV and Petroleum Reduction Credits

Q. What should the plan for achieving annual petroleum reduction entail?

A. The petroleum reduction plan must include the intended strategies and the petroleum reduction amount anticipated from each approach. It must also include the petroleum reduction requirement (and how it was calculated) and details on how each intended strategy contributes toward reaching this amount.

Q. Where can I find guidance on how to estimate the different petroleum reduction options?

A. The Alternative Compliance Planning Tool was developed for this purpose and is available at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/.

Q. How do fleets calculate their petroleum reduction requirement?

A. The petroleum reduction requirement is based on the ACV inventory and the annual average fuel use per covered LDV. The ACV inventory multiplied by the annual average fuel use determines the petroleum reduction requirement. The best way to determine a petroleum reduction requirement is to use the Alternative Compliance Planning Tool at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/.

Q. How do I figure average fuel use per covered LDV in my fleet?

A. If the fleet has the data, the best approach is to find the average fuel use in the fleet's covered LDVs over the last several (such as three) model years. Fleets should use the past year only where previous years' data do not exist. Using a three-year or similar multi-year average will tend to provide a more accurate, longer term average for the fleet, and smooth out individual year fluctuations, easing future planning activities.

To calculate a three-year average, the fleet would add up the total GGEs of fuel used in its entire covered LDV fleet over the past three years, and divide that number by the number of covered LDVs in operation during those model years. (Fleets should avoid simply determining the average fuel used in each covered LDV for each of several previous years, and then simply adding these years together and then dividing by the number of years. This will not provide a true average since it will not accurately reflect possible changes in the number of covered LDVs each year.)

Once the average-fuel-use-per-covered-LDV value is developed in the first year of participation in Alternative Compliance, this value will remain constant throughout the fleet's participation in the option in all subsequent years (unless the fleet submits a rationale to change the value). Changes to this value cannot

be made due to petroleum reduction measures (e.g., fuel economy improvements, including HEVs or VMT reductions) in previous Alternative Compliance years to avoid double-counting petroleum savings. For example, if a fleet purchases and uses HEVs to meet its requirements, the average fuel use per covered LDV will decrease. This new average fuel use per covered LDV cannot be used to calculate the following year's requirement, as this fuel use already includes a compliance method (i.e., HEVs). However, the savings from the HEVs will continue to be counted toward compliance each year that the vehicles are in service.

Q. What are some examples of acceptable average covered LDV fuel use data?

A. DOE will either accept data collected from covered LDVs on fuel use or allow applicants to submit estimates based on reasonable methodologies such as extrapolating fuel use from actual mileage data and published fuel economy values. Another example might be use of general fleet or industry statistics along with a sampling of part of a fleet if it is large. In these cases, DOE will examine the information sources and will require the covered fleet to explain its decision to submit a certain statistical sample.

Q: What if my actual average fuel use per covered LDV turns out to be different than I included in my plan?

A: There is no impact on any plan already submitted. Fleets are encouraged to develop multi-year averages as described in the previous question to minimize the need for significant modifications each year. A fleet is free to use the new average in the next plan it submits; however, should a fleet find a major discrepancy (greater than 10%) between previously submitted averages and actual calculated figures, it needs to explain such discrepancy in its future plan submittal. In addition, if there is a shortfall for any year in which a plan was already submitted, and the fleet needs to use a vehicle acquisition credit previously earned, the conversion rate of the vehicle credit to apply to the Alternative Compliance shortfall will be at the average annual fuel use included in the plan for the applicable year.

Q. Can a fleet include petroleum reductions from non-fleet vehicles using fleet equipment? For example, if a non-fleet vehicle uses the fleet's truck stop electrification bay, can that petroleum reduction be included?

A. No. Reductions in petroleum from third-party vehicles cannot be counted toward the petroleum reduction

requirement. Only petroleum reduction from vehicles under the control of the fleet may be counted.

Q. What methods can be used to reduce petroleum?

A. Numerous methods can be used to reduce petroleum, including, but not limited to:

- Alternative fuel or fuel-efficient technologies in any size on-road vehicle, including light-, medium-, and heavy-duty vehicles
- Biodiesel blends in diesel vehicles (only the biodiesel portion of the blend counts toward compliance.)
- Hybrid or other fuel-efficient vehicles instead of low-mpg vehicles
- Replacement fuels in some qualified non-road vehicles if the acquisition of these vehicles leads directly to the establishment of or upgrading of refueling or recharging infrastructure for expanded alternative fuel use by the fleet's light-duty AFVs (see additional explanation below)
- Fleet management practices that result in reduced VMT

Any strategy must comply with all applicable vehicle emission standards established by the administrator of the EPA under the Clean Air Act.

Q. Are there any restrictions on petroleum reductions from low-level blends?

A. Yes. The amount of alternative fuel in low-level blends (e.g. B2, which is 2% biodiesel with 98% diesel fuel) is limited to the amount of alternative fuel used in excess of any local, state, or federal requirements because of limiting statutory language that was adopted for biodiesel blends. For example, only biodiesel amounts used in blends higher than 2% can be counted toward compliance in a state that requires all diesel fuel in the state to include 2% biodiesel.

Non-Road Vehicles

Q. Does Alternative Compliance include petroleum reductions in non-road vehicles?

A. Yes, if certain requirements are met. Fleets must show that the acquisition of these non-road vehicles leads directly to the establishment or upgrading of alternative refueling or recharging infrastructure for LDVs during an Alternative Compliance model year. Where documented evidence of investments in such infrastructure can be established, a fleet may request that up to 25% of its total petroleum reduction re-

quirement be met with alternative fuel use in these non-road vehicles. This may apply for that year and for future model years after the new or upgraded infrastructure will be used to service at least a portion of the fleet's on-road LDVs. If the covered fleet would like to include more than 25% of its petroleum reduction requirement from non-road vehicles, it must demonstrate that technologies for additional petroleum reduction in the fleet's on-road vehicles are not reasonably available (see page 8 for more information).

Annual Compliance Report

Q. When is the Annual Compliance Report due to DOE?

A. December 31 following the waiver model year.

Q. What is required in the Annual Compliance Report?

A. A statement certifying the actual amount of petroleum motor fuel reduced by the fleet in the Alternative Compliance year through alternative compliance strategies and how the data were collected.

Q. What if a fleet misses the December 31 deadline?

A. It will be in violation of the requirements of the Alternative Fuel Transportation Program (10 CFR Part 490).

Over-Compliance and under-Compliance

Q. What happens to the AFV acquisition credits generated under the Standard Compliance requirements?

A. Fleets with waivers can keep their balance of credits and can continue to sell credits to other fleets. They may also apply them to petroleum reduction shortfalls in limited instances (see page 10 for more information).

Q. What happens if a fleet achieves a petroleum reduction amount higher than the requirement?

A. With DOE's approval, fleets may roll over some excess petroleum reductions for application to future years when a waiver is in effect. Excess petroleum reduction amounts can be banked as insurance against under compliance in subsequent years. Up to 25% of the petroleum reduction requirement can be rolled over annually, pending DOE approval. DOE may consider allowing application of a higher percentage but only under extreme circumstances. Excess petroleum reduction amounts cannot be converted to credits for use to meet the Standard Compliance requirements (see page 11 for more information).

Q. If a fleet decides to return to the Standard Compliance requirements, can the excess petroleum reductions be converted to AFV credits?

A. No. The excess petroleum reductions can only be used under the Alternative Compliance option.

Q. Can fleets trade their excess petroleum reductions to another fleet?

A. No. The roll-over provisions are solely to provide additional flexibility to the fleet that generated the excess petroleum reduction.

Q. How does DOE reconcile with fleets if they fall short in reducing petroleum use during a waiver model year?

A. Fleets will have a chance to purchase credits or use credits earned previously under the Standard Compliance requirements. A fleet must first obtain DOE approval to use credits to make up for a shortfall and must provide details about the particular circumstances that led to the shortfall and provide documentation that shows a good faith effort to meet the requirements. Conversion of credits under the AFV acquisition requirement to GGE under the Alternative Compliance option is calculated by each fleet based on the amount of fuel used each year on average by a fleet LDV. This is the same amount that is used to calculate the petroleum reduction requirement in the fleet's waiver request. DOE gives the fleet until March 31* following the waiver model year to acquire the number of credits required for compliance.

Records and Appeals

Q. How long do fleets have to retain records for Alternative Compliance?

A. DOE requires fleets to retain for a period of three years all necessary documentation needed to support certified petroleum reductions. This requirement is consistent with the documentation requirements for Standard Compliance annual reporting.

Q. Can a fleet appeal a waiver request rejected by DOE?

A. Yes. Fleets may appeal the decision to the Office of Hearings and Appeals using the procedures consistent with the appeals process under the exemption procedures (10 CFR, 490.806(c)). Appeals must be filed within 30 days of notification that DOE rejected a waiver request.

* For model year 2008 only, fleets will be allowed to submit their intent to apply for a waiver by May 31, 2007.

Appendix C: Documentation Checklists

The following checklists detail the information that fleets should provide as part of the Alternative Compliance option. All information submitted to DOE must be verifiable and derived from credible sources. Information on fuel economy and efficiency must be documented. All documents, including back-up papers, must be kept for a minimum of three years.

Intent to Apply for a Waiver

The intent to apply for a waiver is due to DOE no later than March 31* prior to the start of the model year for which Alternative Compliance is sought. It should include the following information:

Required Information

- Name and address of proposing fleet
- Fleet ID number
- Name and contact information (phone number, e-mail, street address) of point of contact
- Name and title of responsible official (if different from point of contact)
- Model year for which the waiver is requested
- Name and address of all fleets included as part of the fleet requesting a waiver

Waiver Request

The waiver request is due to DOE no later than June 30 or July 31, prior to the model year for which Alternative Compliance is sought. It should include the information listed above, as well as the additional data listed below.

Required Information

- Detailed plan of the measures the fleet intends to take to reduce petroleum, including:
 - A general description of the strategy or strategies to be implemented
 - The number of vehicles affected by the strategy
 - The expected petroleum reduction of each strategy
- The fleet's ACV inventory, which is composed of:
 - AFVs acquired in previous model years to comply with the Standard Compliance requirements (minus retirements)
 - LDVs (conventional or AFV) planned to be acquired in the upcoming waiver model year instead of the

AFV requirements that otherwise would be met under the Standard Compliance requirements

- LDVs (conventional or AFV) acquired in previous waiver model years instead of the AFV requirements that otherwise would be met under the Standard Compliance requirements
- The calculated total annual petroleum requirement, based on the ACV inventory, multiplied by the average per vehicle fuel use (in GGE) in fleet LDVs
- Certification by a senior official that the proposing fleet is in compliance with all applicable vehicle emission standards established by the administrator of EPA under the Clean Air Act

Annual Report

The annual report must be submitted to DOE by December 31 following a completed Alternative Compliance model year. It should include the following information.

Required Information

- The fleet's petroleum reduction requirement for the Alternative Compliance model year (submitted earlier)
- The total number of petroleum gallons and/or alternative fuel (in GGE) used by the fleet in its covered LDVs during the Alternative Compliance model year.
- The amount of petroleum reduction achieved by each of the elements in the fleet's plan. If banked credits were used to meet the petroleum reduction requirement, the fleet must document the amount of the shortfall, the average fuel use per LDV in the fleet, and the number of credits requested to be transferred from the fleet's Standard Compliance credit account to meet the shortfall. Also, the fleet must provide details about the particular circumstances that led to the shortfall and provide documentation that shows a good faith effort to meet the requirements.
- If submitting a request to roll over excess petroleum reduction, the fleet must include the amount of petroleum in excess in a previous waiver year, or waiver years, and the amount it wishes to apply, with limitations, as part of the plan to meet the petroleum reduction amount in the waiver year (for more information, see page 11, Roll over of Excess Petroleum Reduction).

*For model year 2008 only, fleets will be allowed to submit their intent to apply for a waiver by May 31, 2007.

Appendix D: Conversion Factors to GGE

Fuel Type	Fuel Measurement Unit	Conversion Factor	GGE Calculation
B100	Gallons	1.015	$GGE = B100 \text{ gal} \times 1.015$
B20	Gallons	1.126	$GGE = B20 \text{ gal} \times 1.126$
CNG	Gallons @ 2400 psi	0.18	$GGE = CNG \text{ gal (@ 2400 psi)} \times 0.18$
CNG	Gallons @ 3600 psi	0.27	$GGE = CNG \text{ gal (@ 3600 psi)} \times 0.27$
CNG	Gallons @ 3000 psi	0.225	$GGE = CNG \text{ gal (@ 3000 psi)} \times 0.225$
CNG	Hundred cubic feet	0.83	$GGE = CNG \text{ ccf} \times 0.83$
Diesel	Gallons	1.147	$GGE = Diesel \text{ gal} \times 1.147$
E85	Gallons	0.72	$GGE = E85 \text{ gal} \times 0.72$
Electric (Ele)	kWh	0.03	$GGE = Ele \text{ kWh} \times 0.03$
Gasoline	Gallons	No conversion needed	$GGE = Gasoline \text{ gal}$
Hydrogen (H2)	kg	1	$GGE = H2 \text{ kg} \times 1$
LNG	Gallons @ 14.7psi and -234°F	0.66	$GGE = LNG \text{ gal} \times 0.66$
LPG	Gallons	0.74	$GGE = LPG \text{ gal} \times 0.74$

Appendix E: Petroleum Reduction Calculation Methodology

This section outlines how fleets can calculate potential petroleum reductions from common methods for on-road vehicles. Methods not included in the document (e.g., off-road vehicles) will be addressed on a case-by-case basis.

The variables in the calculation methodologies are denoted in *italics*. Each variable is described, including possible sources, and the variable name is shown in parentheses. Acceptable sources of information for the variables are also shown. In all cases, the preferred source is provided first.

Calculating the Petroleum Reduction Requirement

The first step in the Alternative Compliance process is determining the petroleum reduction requirement. This requirement is based on the fleet's expected ACV inventory. The following section outlines the calculation methodology for determining the petroleum reduction goal.

► **An interactive** Alternative Compliance tool to assist fleets in making the calculations outlined in this appendix is available online at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool. This automated tool helps users determine their annual petroleum reduction requirement and generate plans based on a variety of fuel displacement methods.

The following outlines the petroleum reduction requirement calculation methodology.

- Determine the cumulative ACV inventory
 - ACVs currently in the fleet (Fleet_ACVs)
 - AFVs required in the Alternative Compliance waiver year (Req_AFVs)
- Subtract ACVs that will be retired before the start of the Alternative Compliance waiver year (Ret_LDVs)

$$ACVs = Fleet_ACVs + Req_AFVs - Ret_ACVs$$

- Calculate petroleum that would be reduced (Petrol_Red)
 - Number of cumulative AFV requirements multiplied by the average fuel use per LDV in the fleet in GGE (Avg_Fuel)

$$Petrol_Red = (ACVs) * (Avg_Fuel)$$

Potential Petroleum Reduction Methods

The potential petroleum reduction strategies are grouped into eight technology categories: AFVs, HEVs, blends, fuel economy, VMT reduction, truck stop electrification, onboard idle reduction, and idling time reduction. As shown below, within each category, there are several methods for reducing petroleum.

- Alternative fuels
 - Fuels: B100, compressed natural gas (CNG), E85, electricity, hydrogen, LNG, LPG
 - Vehicles: Light-duty, medium-duty, heavy-duty
- HEVs
 - Light-duty
 - Medium-duty
 - Heavy-duty
- Blends
 - Biodiesel/diesel
 - B2, B5, B10, B20, B40, B50
- Fuel economy
 - Smaller vehicles
 - Improved maintenance
 - More efficient vehicles
- VMT reduction
 - Ride sharing
 - Telecommuting
- Truck stop electrification
- Onboard equipment
 - Auxiliary power unit (APU)
 - Direct-fired heating
 - Direct heating and cooling
- Idling time reduction

The amount of petroleum reduced for each method is calculated based on projected fleet use patterns and specific assumptions for each technology. Default values were developed to help fleets estimate their consumption patterns. However, it is strongly recommended that fleets use data that are specific to their fleets as these default values are based on general data and may differ significantly from a fleet's performance. Assumptions specific to a single technology are outlined within the pertinent section. Default values that are used in more than one technology are summarized in Table 1.

Table 1. Basic Conversion Factors and Default Values

Parameter	Value	Source
Fuel GGE Conversion Factors		
B100	1.015 GGE/gal B100	Federal Automotive Statistical Tool (FAST)
CNG @ 2400 psi	0.18 GGE/gal CNG	
CNG @ 3600 psi	0.27 GGE/gal CNG	
CNG @ 3000 psi	0.225 GGE/gal CNG	
Diesel	1.147 GGE/gal diesel	
E85	0.72 GGE/gal E85	
Electricity	0.03 GGE/kWh	
Gasoline	1 GGE/gal gasoline	
Hydrogen	1 GGE/kg H2	
LNG @ 14.7 psia and -234 °F	0.66 GGE/gal LNG	
LPG	0.74 GGE/gal LPG	
Blend Factors (GCF_BL)		
B2	1.144 GGE/gal B2	Derived from biodiesel, diesel and gasoline lower heating values (LHVs) in the Alternative Fuels Data Center and FAST
B5	1.140 GGE/gal B5	
B10	1.134 GGE/gal B10	
B20	1.121 GGE/gal B20	
B40	1.094 GGE/gal B40	
B50	1.081 GGE/gal B50	
Gross Vehicle Weight (GVW)		
Light-duty (LD)	<= 8,500 lbs	Davis et al. 2006
Medium-duty (MD)	8,500-26,000 lbs	
Heavy-duty (HD)	> 26,000 lbs	
Fuel Economy (FE) (in mpg)		
Gasoline cars		
Subcompact	22.4	AEO 2006 (Table 57) new car values, adjusted by the car degradation factor (Table 49)
Compact	24.9	
Midsize	21.6	
Large	20.3	
Diesel cars		
Compact	32.6	Same as above
Midsize	28.5	
Gasoline light-duty trucks		
Small pickup or van	20.7	AEO 2006 (Table 57), new car values adjusted by LDT degradation factor (Table 49)
Large pickup or sport utility vehicle (SUV)	16.0	
Large van	21.6	
Small utility	19.3	

Table 1 continued on next page

Table 1 - cont. Basic Conversion Factors and Default Values

Parameter	Value	Source
Fuel Economy (FE) (in mpg)		
Diesel light-duty trucks		
Large pickup or SUV	21.2	Same as above
Large van	28.6	
Small utility	25.2	
Gasoline Medium-duty trucks		
MD truck < 14,000 lbs	8.6	Chevy Silverado
Diesel medium-duty trucks		
MD truck < 14,000 lbs	10.5	Davis et al. 2006, Table 5.4 – 2002 values
MD truck < 26,000 lbs	7.0	
Heavy-duty truck	5.8	
VMT		
Car	12,242	Davis et al. 2006, Table 4.1
LD truck	11,467	Davis et al. 2006, Table 4.2
MD truck < 14,000 lbs	14,094	Davis et al. 2006, Table 5.4
MD truck 14,000-26,0000 lbs	12,671	Davis et al. 2006, Table 5.4
HD truck	14,716	Davis et al. 2006, Fig. 7.2

The methodology for calculating the petroleum reduced for each technology is outlined below. In addition, for AFVs and blends, the amount of alternative fuel or blend required is also calculated.

Alternative Fuels

Several alternative fuels may be used to displace petroleum. The most common alternative fuels for AFVs are E85, CNG, LNG, LPG, and electricity. In addition, there are several alternative fuels, such as B100, that can be used in conventional vehicles. The following section outlines the methodology for calculating petroleum reduction using alternative fuels. *Please note:* 1 gallon of E85 is assumed equal to 1 gallon of alternative fuel.

Alternative Fuels Calculation Methodology

- Determine the fuel GGE conversion factor (GCF) (LHV fuel/LHV gasoline) for the vehicles being replaced. If the vehicles are gasoline powered, the GCF is 1; if they are diesel, the GCF is 1.147. (GCF).
- Determine number of vehicles that will use the alternative fuel (Num_vehicles)
- Estimate average annual fuel use for each vehicle.

- Obtain average fuel economy (FE) of each vehicle make and model using conventional fuel (e.g., gasoline or diesel) from current fleet records or www.fueleconomy.gov. Default values based on the vehicle type are available in Table 1 (Avg_FE). However, since default values are based on nationwide statistics, they can vary considerably from your actual fleet data. Therefore, we strongly recommend you use fleet-specific data when available.
- Estimate the number of miles that each vehicle will use from the annual average VMT for your light-duty fleet. If you do not have this data, default values are available in Table 1 (Avg_VMT).
- Estimate the amount of time the vehicles will use the alternative fuel (Frac).
- Determine the GGE conversion factor from Table 1 for the alternative fuel. (GCF_AF).

Calculations

$$GGE_Reduced = (Num_vehicles) * (Avg_VMT) * (Frac) * (GCF) / (Avg_FE)$$

$$Total\ AF\ Required = (GGE_Reduced) / GCF_AF$$

Example: AFV Calculation

To use E85 in three mid-size vehicles 50% of the time:

Average VMT = 12,242 miles
 Average fuel economy = 28.04 mpg
 Num_vehicles = 3
 Avg_VMT = 12,242 miles
 Avg_FE = 28.04 mpg
 Frac = 0.50
 GCF = 1.0 GGE/gallon gasoline
 $GGE_Reduced = 3 * (12,242 / 28.04) * 0.5 * 1$
 = 655 GGE
 Total E85 Required = 655 GGE / 0.72
 = 910 gallons

HEVs

HEVs (hybrid electric vehicles) combine a conventional gasoline-powered engine with a battery-powered electric motor. Because they have no appreciable range on the battery alone, they are not considered AFVs. The estimation of savings from these vehicles is based on the fuel economy of the current vehicles and that of the proposed HEVs, along with the VMT.

Any technologies, including plug-in hybrids, must comply with the Clean Air Act certification that is required with a fleet's application for a waiver. For specific details on the certification see 490.805(c)(5).

HEVs Calculation Methodology

Gather baseline information:

- Determine the fuel GGE conversion factor (i.e., LHV fuel/LHV gasoline) for the vehicles being replaced. If the vehicles are gasoline powered, the GCF is 1; if they are diesel, the GCF is 1.147 (GCF).
- Determine number of vehicles to be replaced with HEVs (Num_vehicles)
- Estimate average annual fuel use for each vehicle.
 - Obtain average fuel economy of each conventional vehicle make and model from current fleet records or from www.fueleconomy.gov. Default values based on the vehicle type are available in Table 1 (FE_{conv}). However, since default values are based on nationwide statistics, they can vary considerably from your actual fleet data. Therefore, we strongly recommend you use fleet-specific data when possible.
 - Estimate the number of miles that each vehicle will drive from the annual average VMT for your light-duty fleet. Or you may use the default value based on the type of vehicle from Table 1 (Avg_VMT).

- Estimate average annual fuel use for each HEV.
 - Obtain average fuel economy (FE) of each HEV from fleet records or from www.fueleconomy.gov (FE_{HEV}).

Calculation

$$GGE_Reduced = (Num_vehicles) * (Avg_VMT) * (GCF) * (1/FE_{conv} - 1/FE_{HEV})$$

Example: HEV Calculation

To replace five large sedans with Toyota Prius vehicles:

Avg VMT of the large sedans = 15,233 miles
 Avg FE of large sedans = 23.6 mpg
 FE of Toyota Prius = 55 mpg
 $GGE\ Saved = 5 * 15,233 * (1/23.6 - 1/55)$
 = 1,843 GGE

Blends

Numerous blends of alternative fuels are available. In general, these blends are made up of low levels of ethanol with gasoline or biodiesel with diesel. The most common blends of biodiesel are B2 (2% biodiesel), B5, B10, B20, B40, and B50. For virtually all cases of ethanol blends, the base fuel contains ethanol and thus could not be counted for compliance.

Some states and localities have requirements for blends of biodiesel or ethanol. For ethanol, however, the base fuel available is already an ethanol blend. In these cases, only the portion of the blend with an alternative fuel content in excess of the base fuel requirement can be considered for compliance purposes.

Blends Calculation Methodology

- Determine the GGE conversion factor for the type of vehicles using the fuel; GCF = 1 for gasoline vehicles and GCF = 1.147 for diesel vehicles (GCF).
- Determine number of vehicles to use the blend (Num_vehicles).
- Estimate the average annual fuel use for each vehicle.
 - Obtain average fuel economy of each vehicle make and model from current fleet records or from www.fueleconomy.gov. Default values based on the vehicle type are available in Table 1 (Avg_FE). However, since default values are based on nationwide statistics, they can vary considerably from your actual fleet data. Therefore, we strongly recommend you use fleet-specific data.
 - Estimate the number of miles that each vehicle

will use from the annual average VMT for your light-duty fleet or use the default value based on the vehicle type from Table 1 (Avg_VMT).

- Determine the conventional fuel content of the blend (CF_content).
- Determine the GGE conversion factor for the blend (GCF_BL) from Table 1.
- Estimate the fraction of time the vehicles will use the blend (Frac).

Calculations

To calculate conventional fuel (CF) that would be required in GGE:

$$CF = (\text{Num_vehicles}) * (\text{Avg_VMT}) * (\text{Frac}) * (\text{GCF}) / (\text{Avg_FE})$$

To convert the conventional fuel requirement to an equivalent amount of the blend (BR) in gallons:

$$BR = CF / \text{GCF_BL}$$

To calculate conventional fuel in blend (CFB) in GGE:

$$CFB = (BR) * (CF_content) * \text{GCF}$$

To calculate fuel saved:

$$\text{GGE_Saved} = CF - CFB$$

Example: Blend Calculation

To use B20 in five diesel-powered heavy-duty vehicles 90% of the year:

Average VMT for the vehicles is 25,655 miles

Average FE for the vehicles is 7.8 mpg

$$CF = 5 * 25,655 * 0.9 * 1.147 / 7.8 \\ = 16,977 \text{ GGE}$$

$$BR = 16,977 / 1.121 \\ = 15,145$$

$$CFB = 15,145 * 0.8 * 1.147 \\ = 13,897 \text{ GGE}$$

$$\text{GGE_Saved} = 16,977 - 13,897 \\ = 3,080 \text{ GGE}$$

VMT Reduction Calculation Methodology

- Determine if vehicles targeted for VMT reduction are diesel or gasoline, and determine their GGE conversion factor from Table 1 (GCF).
- Identify number of vehicles targeted for VMT reduction by vehicle make and model (Num_vehicles).
- Obtain the average fuel economy of each vehicle make and model from current fleet records or from www.fueleconomy.gov. Default values based on the vehicle type are available in Table 1 (FE). However, since default values are based on nationwide statistics, they can vary considerably from your actual fleet data. Therefore, we strongly recommend you use fleet-specific data when possible.
- Obtain the average current VMT for each vehicle make and model from current fleet records or use default values based on the vehicle type from Table 1 (VMTold).
- Estimate reduced VMT for each vehicle type or class. (VMTnew)

Calculation

$$\text{GGE_Reduced} = (\text{Num_vehicles}) * (\text{VMT}_{old} - \text{VMT}_{new}) * (1/\text{FE}) * (\text{GCF})$$

Fuel Economy Improvement

Numerous methodologies are available to improve the fuel economy of a fleet. Technologies in this category include the substitution of more efficient vehicles and increased maintenance (such as ensuring proper tire inflation).

Fuel Economy Calculation Methodology

- Determine if vehicles targeted for FE improvement are diesel or gasoline and look up the GGE conversion factor in Table 1 (GCF).
- Identify number of vehicles targeted for FE improvement by vehicle make and model (Num_vehicles).
- Determine average current fuel economy of each vehicle make and model from current fleet records or from www.fueleconomy.gov. Default values based on the vehicle type are available in Table 1 (FE_{old}). However, since default values are based on nationwide statistics, they can vary considerably from your actual fleet data. Therefore, we strongly recommend you use fleet-specific data.
- Determine average current VMT for each vehicle make and model from fleet records or use default

VMT Reduction

VMT reduction refers to substituting conventional travel with a mode of transportation that reduces petroleum consumption. This includes biking, driving neighborhood electric vehicles, walking, eliminating trips using technologies (such as telecommuting or videoconferencing), and increasing the efficiency of existing vehicles by using mass transit or developing advanced fleet strategies.

Table 2: Example VMT Reduction Input and Results

Vehicle Name	Number of Vehicles	Fuel Economy (mpg)	Old VMT	New VMT	Projected Petroleum Savings per Vehicle (GGE)
2005 Ford Taurus	12	22	12,547	8,500	2,207 GGE
2003 Chevy Tahoe	10	13	15,477	10,000	4,213 GGE

Table 3: Example FE Improvement Input and Results

Scenario	Number of Vehicles	Old Fuel Economy (mpg)	New Fuel Economy (mpg)	VMT	Projected Petroleum Savings per Vehicle (GGE)
Replace three maintenance vehicles with low-speed vehicles	3	22	65	8,500	767
Replace Chevrolet Tahoes with Honda Civics	5	13	35	10,000	2,418

Table 4: Default Values for Truck Stop Electrification

Parameter	Value	Source
Fuel used during idling (idle fuel)	1 gal/hour/vehicle	Stodolsky, et al. 2000
Time each bay is used	2400 hour/year	Bubbosh, 2004

values from Table 1 based on the vehicle type (VMT).

- Project improved FE for each vehicle type or class from www.fueleconomy.gov (FE_{new}).

Calculation

$$GGE_Reduced = (Num_vehicles) * (VMT) * (1/FE_{old} - 1/FE_{new}) * (GCF)$$

Truck Stop Electrification

This idle reduction method allows drivers to plug their vehicles into truck stop stalls that power necessary systems without engine idling.

Truck Stop Electrification Calculation Methodology

- Determine if vehicles using a truck stop electrification facility are diesel or gasoline (it is likely they are diesel). Find GGE conversion factor from Table 1 (GCF). Only the fleet's vehicles can be counted for compliance. Use of the facility by other vehicles cannot be counted.

- Identify number of bays in the idle reduction facility (Num_bays).
- Estimate the average amount of time in hours/year each bay will be used based on current fleet records or use the default value from Table 4 (Hours). However, since default values are based on nationwide statistics, they can vary considerably from your actual fleet data. Therefore, we strongly recommend you use fleet-specific data when possible.
- Estimate the average amount of fuel the fleet's trucks use while idling in gallons/hour from current fleet records, or use default value for truck stop electrification from Table 4 (Idle_Fuel).

Calculation

$$GGE_Reduced = (Num_bays) * (Hours) * (Idle_Fuel) * (GCF)$$

Example: Truck Stop Electrification Calculation

$$\begin{aligned} GGE_Saved &= (10) * (2,132) * (1.147) \\ &= 24,454 \text{ GGE} \end{aligned}$$

Table 5: Default Values for Other Idle Reduction

Parameter	Value	Source
<u>Fuel Used during Idling (Idle_Fuel)</u>		
HD truck	1 gal diesel/hour/vehicle	Stodolsky et al. 2000
Bus	.5 gal diesel/hour/vehicle	
LDV or MDV	No default available	
<u>Idling Days per Year (Days)</u>		
HD truck	365 days/year	Assumption: Number of school days/year
Bus	180 days/year	
LDV or MDV	No default available	

Idling Time Reduction

This idle reduction method refers to times that the truck engine is turned off instead of left idling.

Idling Time Reduction Calculation Methodology

- Determine if vehicles with reduced idling time are diesel or gasoline, and determine the GGE conversion factor from Table 1 (GCF).
- Determine the number of vehicles that will reduce idling (Num_vehicles).
- Estimate the average time in hours per day that the idling time for the vehicle will be reduced from fleet records (Time).
- Estimate the number of days per year that the vehicles operate from fleet records or use a default value from Table 5, if available, based on the type of vehicle (Days). However, since default values are based on nationwide statistics, they can vary considerably from your actual fleet data. Therefore, we strongly recommend you use fleet-specific data when possible.
- Estimate the amount of fuel the truck uses while idling from fleet records, or use a default value from Table 5, if available, based on the type of vehicle (Idle_Fuel)

Calculation

$$\text{GGE_Reduced} = (\text{Num_vehicles}) * (\text{Time}) * (\text{Idle_Fuel}) * (\text{Days}) * (\text{GCF})$$

Example: Idling Time Limit Calculation

Four buses reduce their idling by 35 minutes per day. The buses operate 250 days per year.

$$\begin{aligned} \text{GGE_Reduced} &= (4) * (35/60) * (1) * (250) * (1.147) \\ &= 669 \text{ GGE} \end{aligned}$$

Onboard Idle Reduction

This IR method includes APUs and other onboard power sources that can heat, cool, or provide electricity to a truck cab without engine idling.

Calculation Methodology

- Determine if vehicles using onboard idle reduction are diesel or gasoline (it is likely they are diesel). Find the GGE conversion factor in Table 1 (GCF).
- Determine the number of vehicles with onboard equipment (Num_vehicles).
- Determine the fraction of idling fuel use saved by the proposed equipment from vendor guarantees or use the default value based on the type of equipment from Table 6. (Equip_Save). However, since default values are based on nationwide statistics, they can vary considerably from your actual fleet data. Therefore, we strongly recommend you use fleet-specific data when available.
- Estimate the average time in hours/vehicle the equipment will be used from fleet records or use the default value from Table 6 (Hours).

Table 6: Default Values for Onboard Idle Reduction

Parameter	Value	Source
<u>Fuel Used Idling (Idle_Fuel)</u>		
HD truck	1 gal diesel/hour/vehicle	Stodolsky et al. 2000
Bus	0.5 gal diesel/hour/vehicle	EPA idle cost calculator
LDV and MDV	No default available	
Average idling time per year per vehicle (Hours_Used)	1830 hour/year	Stodolsky et al. 2000
<u>Equipment Savings (Equip_Save)</u>		
APU	0.82	Gaines 2004
Direct-fired heater (heating for cab/sleeper and/or engine)	0.40	
Direct heat with thermal storage cooling (heating and A/C for cab/sleeper and heat for engine)	0.90	

- Estimate the amount of fuel in gallons/hour the truck uses while idling from fleet records or use a default value, if available, based on the type of vehicle from Table 6 (Idle_Fuel).

Calculation

$$GGE_Reduced = (Num_vehicles) * (Hours) * (Idle_Fuel) * (Equip_Save) * (GCF)$$

Example: Onboard Idle Reduction Savings Calculation

Install APUs in 11 diesel-powered vehicles, assuming the average idling time per year.

$$GGE_Reduced = 11 * 1830 * 1 * 0.82 * 1.147 \\ = 18,933 \text{ GGE}$$

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Appendix F: Alternative Compliance Example Calculations

To participate in the Alternative Compliance option, fleets must develop a waiver request that is approved by DOE. The waiver request includes a petroleum reduction requirement for the waiver model year and a plan for achieving the required petroleum reduction amount. There are two steps in applying for a waiver:

Step 1: Calculate the Petroleum Reduction Requirement

Step 2: Develop a Plan for Achieving the Annual Petroleum Reduction Requirement Calculated in Step 1

This document offers sample calculations for each step, as well as case studies on different compliance strategies over multi-year periods.

Step 1: Calculate the Petroleum Reduction Requirement

Each participating fleet must estimate the amount of petroleum it is required to reduce. The steps involved in making this determination are listed below.

► **In addition**, an interactive Alternative Compliance tool to assist fleets making the calculations outlined in this appendix is available online at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool. This automated tool helps users determine their annual petroleum reduction requirement and generate plans based on a variety of petroleum reduction methods.

1. Calculate your annual AFV acquisition requirement for the model year for which a waiver is sought. Do this the same way you would figure your LDV count and AFV acquisition requirement for reporting form DOE/FCVT/101 (www.eere.energy.gov/vehiclesandfuels/epact/docs/fleet_report_05_2004.xls)
2. Determine the number of AFVs currently in your fleet that were acquired and reported to DOE (on form DOE/FCVT 101) in previous model years for the Standard Compliance requirements. AFVs not included in this category are AFVs acquired but not used to comply with Standard Compliance and AFVs acquired above the number necessary to meet the requirement for that year (resulting in banked credits).
3. Add numbers 1 and 2.
4. Because the requirement is cumulative, if you were previously granted a waiver, you must determine the number of LDVs (conventional or AFV) still in your fleet that were acquired in previous waiver model years instead of the AFV requirements that otherwise would be met under Standard Compliance.
5. Add numbers 4 and 3. This is your ACV inventory at this time.
6. Determine if any of the ACVs will be retired before the subject model year.
7. Subtract 6 from 5. This is your ACV inventory for the waiver model year.
8. Calculate the amount of petroleum an average covered LDV in your fleet uses annually. You must either use data collected by your fleet or show a reasonable methodology to arrive at such a number.
9. Multiply 8 by 7. The result is your requirement.

Figure 3 shows this calculation for three years. **Note:** ACV inventories are kept for fleets and DOE at www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi. Fleets should keep their inventories updated.

Step 2: Develop a Plan for Achieving the Annual Petroleum Reduction Requirement Calculated in Step 1

After the annual petroleum reduction requirement is calculated, a plan for meeting it must be developed. For this, the fleet needs to examine its situation and determine where petroleum savings may be achieved most easily. Entities can reduce petroleum through a number of methods. These methods, along with sample calculations, are detailed in this section.

» Figure 3

Example Calculation over a Three-Year Period for a State Fleet

Year 1 (The first year the fleet is applying for a waiver)

- 55 pre-waiver required AFVs in the fleet previously reported to DOE in an annual report (DOE/FCVT/101)
- 18 requirements (75% of 24 planned LDV acquisitions)
- ACV inventory: 73 vehicles (55 + 18 = 73)
- Average annual fuel use per LDV: 500 GGE
- Target petroleum reduction amount: 36,500 GGE (500 GGE x 73 vehicles)

Year 2

- 50 pre-waiver required AFVs in the fleet previously reported to DOE in an annual report (DOE/FCVT/101), as 5 were retired
- 15 requirements (75% of 20 planned LDV acquisitions)
- 18 requirements from Year 1
- Total requirement: 83 vehicles (50 + 15 + 18 = 83)
- Average annual fuel use per LDV: 500 GGE
- Target petroleum reduction amount: 41,500 GGE (500 GGE x 83 vehicles)

Year 3

- 40 pre-waiver required AFVs in the fleet previously reported to DOE in an annual report (DOE/FCVT/101) as 10 more were retired
- 21 requirements (75% of 28 planned LDV acquisitions)
- 15 requirements from Year 2
- 18 requirements from Year 1
- Total requirement: 94 vehicles (40 + 21 + 15 + 18 = 94)
- Average annual fuel use per LDV: 500 GGE
- Target petroleum reduction amount: 47,000 GGE (500 GGE x 94 vehicles)

Alternative Fuels

A fleet is replacing petroleum through the use of E85 in five of its large vans. It has the data on VMT and fuel economy for these vans. The fleet estimates that the vans will use E85 about 75% of the time.

Equations

Two equations are used for this method: GGE of petroleum reduced and the amount of alternative fuel required.

Petroleum Reduced:

$$GGE_Reduced = (Num_vehicles) * \frac{(Avg_VMT)}{(Avg_FE)} * (Frac) * (GCF)$$

Alternative Fuel Required:

$$Total_AF_Required = \frac{(GGE_Reduced)}{(CF_AF)}$$

Where:

Num_vehicles: Number of vehicles = 5
 Avg_VMT: Average VMT = 15,500 miles per year per vehicle
 Avg_FE: Average fuel efficiency of a van using gasoline = 20.5 mpg
 Frac: Fraction of the time these vans will be using E85 = 0.75
 GCF: GGE conversion factor for gasoline = 1 GGE/gal gasoline
 CF_AF: conversion factor for alternative fuel = 0.72 GGE/gal E85

Calculations

Petroleum Reduced:

$$GGE_Reduced = (Num_vehicles) * \frac{(Avg_VMT)}{(Avg_FE)} * (Frac) * (GCF)$$

$$GGE_Reduced = (5 \text{ vehicles}) * \frac{(15,500 \text{ miles/vehicle})}{(20.5 \text{ miles/gal})} * (0.75) * (1 \text{ GGE/gal})$$

$$GGE_Reduced = 2,835 \text{ GGE}$$

Total Alternative Fuel Required:

$$Total_AF_Required = \frac{(GGE_Reduced)}{(CF_AF)}$$

$$Total_AF_Required = \frac{(2,835 \text{ GGE})}{(0.72 \text{ GGE/gal E85})} = 3,938 \text{ gallons of E85}$$

HEVs

A fleet is displacing petroleum by adding six Ford Escape hybrids to its fleet instead of non-hybrid SUVs.

Equation

There is one equation used for this method.

Petroleum Reduced:

$$GGE_Reduced = (Num_vehicles) * (Avg_VMT) * GCF * \left(\frac{1}{FE_{conv}} - \frac{1}{FE_{HEV}} \right)$$

Where:

Num_vehicles: Number of vehicles = 6
 Avg_VMT: Average VMT = 12,200 miles per year
 GCF: GGE conversion factor for gasoline = 1 GGE/gal gasoline
 FE_{HEV}: Fuel economy of a new Hybrid Ford Escape= 33 mpg (Source: www.fueleconomy.gov)
 FE_{conv}: Fuel economy of a conventional Ford Escape= 23.4 mpg (Source: www.fueleconomy.gov)

Calculation

Petroleum Reduced:

$$GGE_Reduced = (Num_vehicles) * (Avg_VMT) * GCF * \left(\frac{1}{FE_{conv}} - \frac{1}{FE_{HEV}} \right)$$

$$GGE_Reduced = (6 \text{ vehicles}) * (12,200 \text{ mi/vehicle}) * (1 \text{ GGE/gal}) * \left(\frac{1}{23.4 \text{ miles/gal}} - \frac{1}{33 \text{ miles/gal}} \right)$$

$$GGE_Reduced = 910 \text{ GGE of gasoline}$$

Blending B2

A fleet is reducing petroleum by replacing all of its diesel fuel with B2. There are no biodiesel blend requirements in its state, so the entire amount of biodiesel can be considered a displacement.

Equations

Four equations are used for this method: the conventional fuel that would be required, the blend equivalent of the conventional fuel, the amount of conventional fuel in the blend, and the conventional fuel reduced.

Conventional Fuel (CF) Required:

$$CF = (Num_vehicles) * (Avg_VMT) * (Frac) * \left(\frac{GCF}{Avg_FE} \right)$$

Blend Required (BR) to Replace Conventional Fuel (in gallons):

$$BR = \left(\frac{CF}{GCF_BL} \right)$$

Amount of Conventional Fuel in Blend (CFB) in GGE:

$$CFB = (BR) * (CF_content) * GCF$$

Conventional Fuel Reduced (in GGE):

$$GGE_Reduced = CF - CFB$$

Where:

Num_vehicles: Number of vehicles to use B2 = 42

Avg_VMT: Average VMT = 13,687 miles per year

Frac: Fraction of the time these vans will be using B2 = 0.66

GCF: GGE Conversion Factor for the diesel that they were previously running on is 1.147 GGE/gal (GCF)

Avg_FE: Average fuel efficiency of an HD truck = 7.3 mpg (Source: Table 1, Appendix E)

GCE_BL = GGE Conversion factor of the B2 blend = 1.144 GGE

(Source: Table 1, Appendix E)

CF_cont = Conventional fuel content of the blend = 98% for B2

Calculations

Conventional Fuel (CF) Required:

$$CF = (Num_vehicles) * (Avg_VMT) * (Frac) * \left(\frac{GCF}{Avg_FE} \right)$$

$$CF = (42 \text{ vehicles}) * (13,687 \text{ miles/vehicle}) * (0.66) * \left(\frac{1.147 \text{ GGE/gal}}{7.3 \text{ miles/gal}} \right)$$

$$CF = 59,613 \text{ GGE of conventional fuel}$$

Blend Required (BR) to Replace Conventional Fuel (in gallons):

$$BR = \left(\frac{CF}{GCF_BL} \right)$$

$$BR = \left(\frac{59,613 \text{ GGE}}{1.144 \text{ GGE/gal}} \right)$$

$$BR = 52,109 \text{ gallons of blend}$$

Amount of Conventional Fuel in Blend (CFB) in GGE:

$$CFB = (BR) * (CF_content) * (GCF)$$

$$CFB = (52,109 \text{ gal.}) * (0.98) * (1.147 \text{ GGE/gal diesel})$$

$$CFB = 58,574 \text{ GGE}$$

Conventional Fuel Reduced (in GGE):

$$GGE_Reduced = CF - CFB$$

$$GGE_Reduced = (59,613 \text{ GGE}) - (58,574 \text{ GGEI})$$

$$GGE_Reduced = 1,039 \text{ GGE}$$

Blending 5% Biodiesel (B5), with State Mandate

A fleet is reducing petroleum use by replacing all of its diesel fuel with B5. However, B2 is required in its state, so only the additional 3% of the blend counts toward the reduction. Because of this, the fleet must calculate the amount of conventional fuel reduced for B5 then calculate the amount of conventional fuel reduced if using B2 in the same fleet, and subtract that amount. The characteristics of its diesel fleet are the same as in the example above.

Equations

Six equations are used for this method: the conventional fuel required, the blend required to replace this fuel, the amount of conventional fuel in the blend, conventional fuel reduced, required conventional fuel reductions for compliance to state mandate, and conventional fuel reduced that exceeds the state requirements.

Conventional Fuel (CF) Required:

$$CF = (Num_vehicles) * (Avg_VMT) * (Frac) * \left(\frac{GCF}{Avg_FE} \right)$$

Blend Required (BR) to Replace Conventional Fuel (in gallons):

$$BR = \left(\frac{CF}{GCF_BL} \right)$$

Amount of Conventional Fuel in Blend (CFB):

$$CFB = (BR) * (CF_content) * (GCF)$$

Conventional Fuel Reduced:

$$GGE_Reduced = (CF) - (CFB)$$

Required Reductions for Compliance with State Mandate:

$$\text{Required_Reductions} = (CF) - (CFB) \text{ for required blend}$$

Conventional Fuel Reduced that Exceeds State Requirements:

$$\text{Reduction_A\&B} = (\text{GGE_Reduced}) - (\text{Required_Reductions})$$

Where:

Num_vehicles: Number of vehicles to use B2 = 42

Avg_VMT: Average VMT = 13,687 miles per year

Frac: Fraction of the time these vans will be using B5 = 0.66

GCF: GGE conversion factor for the diesel that they were previously running on = 1.147 GGE/gal (GCF)

Avg_FE: Average fuel efficiency of a HD truck = 7.3 mpg (source: Table 1)

GCE_BL: GGE conversion factor of the B5 Blend = 1.140 GGE (source: Appendix E, Table 1)

CF_cont: Conventional fuel content of the blend is 95% for B5

Required_Reduction: Quantity of conventional fuel that would have been reduced under the B2 requirement = 1,057 GGE of diesel (as in previous example)

Calculations:

Conventional Fuel (CF) Required:

$$CF = (\text{Num_vehicles}) * (\text{Avg_VMT}) * (\text{Frac}) * \left(\frac{\text{GCF}}{\text{Avg_FE}} \right)$$

$$CF = (42 \text{ vehicles}) * (13,687 \text{ miles/vehicle}) * (0.66) * \left(\frac{1.147 \text{ GGE/gal}}{7.3 \text{ miles/gal}} \right)$$

$$CF = 59,613 \text{ GGE}$$

Blend Required (BR) to Replace Conventional Fuel (in gallons):

$$BR = \left(\frac{CF}{\text{GCF_BL}} \right)$$

$$BR = \left(\frac{59,613 \text{ GGE}}{1.140 \text{ GGE/gal}} \right)$$

$$BR = 52,292 \text{ gal blend}$$

Amount of Conventional Fuel in Blend (CFB):

$$CFB = (BR) * (CF_content) * (GCF)$$

$$CFB = (52,292 \text{ gal}) * (0.95) * (1.147 \text{ GGE/gal})$$

$$CFB = 56,980 \text{ GGE diesel}$$

Conventional Fuel Reduced:

$$\text{GGE_Reduced} = (CF) - (CFB)$$

$$\text{GGE_Reduced} = (59,613 \text{ GGE diesel}) - (56,980 \text{ GGE diesel})$$

$$\text{GGE_Reduced} = 2,633 \text{ GGE diesel}$$

Required Reductions for Compliance with State Mandate:

$$\text{Required_Reductions} = (CF) - (CFB) \text{ for required blend.}$$

This calculation was done for B2 in the previous example

$$\text{Required_Reductions} = 1,039 \text{ GGE}$$

Conventional Fuel Reduced "Above and Beyond" State Requirements:

$$\text{Reduction_A\&B} = (\text{GGE_Reduced}) - (\text{Required_Reductions})$$

$$\text{Reduction_A\&B} = (2,633 \text{ GGE}) - (1,039 \text{ GGE})$$

$$\text{Reduction_A\&B} = 1,594 \text{ GGE}$$

Fuel Economy Improvement

A fleet plans to reduce petroleum use by substituting small pickup trucks for large ones.

Equation

There is one equation used for this method.

Petroleum Reduced (in GGE):

$$\text{GGE_Reduced} = (\text{Num_vehicles}) * (\text{Avg_VMT}) * \text{GCF} * \left(\frac{1}{FE_{old}} - \frac{1}{FE_{new}} \right)$$

Where:

Num_vehicles: Number of vehicles = 42 vehicles

Avg_VMT: Average VMT = 11,467 miles per year (Source: Appendix E, Table 1)

GCF: GGE conversion factor for gasoline = 1 GGE/gal gasoline

FE_{new}: Average fuel economy of a new small pickup truck = 25.37 mpg (Source: Appendix E, Table 1)

FE_{old}: Average fuel economy of a large pickup truck (like those being replaced) = 19.41 mpg

Calculation

Petroleum Reduced (in GGE):

$$\text{GGE_Reduced} = (\text{Num_vehicles}) * (\text{Avg_VMT}) * \text{GCF} * \left(\frac{1}{FE_{old}} - \frac{1}{FE_{new}} \right)$$

$$\text{GGE_Reduced} = (42 \text{ vehicles}) * (11,467 \text{ mile/vehicle}) * (1 \text{ GGE/gal}) * \left(\frac{1}{19.41 \text{ mile/gal}} - \frac{1}{25.37 \text{ mile/gal}} \right)$$

$$(\text{GGE_Reduced}) = 5,829 \text{ GGE}$$

VMT Reduction

A fleet has established a ride-sharing program from its headquarters to a work site that reduces the number of miles driven. (Note that ride-sharing programs for employees to reduce petroleum use in commuting to work are not covered under this program and are not valid petroleum reduction strategies.) As part of the program, the fleet conducts a survey that estimates the total VMT before and after the program, the average fuel economy of the vehicles, and the total VMT once the program is in operation.

Equation

There is one equation used for this method.

Petroleum Reduced (in GGE):

$$GGE_Reduced = (Num_vehicles) * (VMT_{old} - VMT_{new}) * \left(\frac{1}{FE} \right) * GCF$$

Where:

Num_vehicles: Number of cars that are targeted for VMT reduction through the program = 120

VMT_{old}: Average commuter miles for participating vehicles before the program = 7,600 miles

VMT_{new}: Average commuter miles for participating vehicles during the program = 4,800 miles

FE: Average fuel economy of a vehicle participating in the program = 25.8 mpg

GCF: All participants drive gasoline-powered vehicles with a conversion factor of 1 GGE/gal

Calculation

Petroleum Reduced (in GGE):

$$GGE_Reduced = (Num_vehicles) * (VMT_{old} - VMT_{new}) * \left(\frac{1}{FE} \right) * (GCF)$$

$$GGE_Reduced = (120 \text{ vehicle}) * (7,600 \text{ mile/year} - 4,800 \text{ mile/year}) * \left(\frac{1}{25.8 \text{ mi/gal}} \right) * (1 \text{ GGE/gal})$$

$$GGE_Reduced = 13,023 \text{ GGE}$$

Truck Stop Electrification

A fleet plans to install an electric truck stop to reduce diesel fuel use in its trucks. Based on fleet patterns, it decides to include 12 bays and estimates how many hours each bay will be used. The fleet already has data on how many gallons its average truck consumes while idling.

Equation

There is one equation used for this method.

Petroleum Reduced (in GGE):

$$GGE_Reduced = (Num_bays) * (Hours) * (Idle_Fuel) * (GCF)$$

Where:

Num_bays: Number of bays where trucks can be plugged in = 12

Hours: Average number of hours a bay is used per year = 1980

Idle_Fuel: Average amount of diesel fuel one of your trucks uses per hour of idling = 1.2 gal

GCF: Conversion factor for diesel fuel = 1.147 GGE/gal

Calculation

Petroleum Reduced (in GGE):

$$GGE_Reduced = (Num_bays) * (Hours) * (Idle_Fuel) * (GCF)$$

$$GGE_Reduced = (12 \text{ bays}) * (1980 \text{ hours/bay}) * (1.2 \text{ gal/hour}) * (1.147 \text{ GGE/gal})$$

$$GGE_Reduced = 32,703 \text{ GGE}$$

Onboard Idle-Reduction Equipment

A fleet installs APUs onboard its trucks to reduce the amount of diesel fuel used in trucks while idling.

Equation

There is one equation used for this method.

Petroleum Reduced (in GGE):

$$GGE_Reduced = (Num_vehicles) * (Hours) * (Idle_Fuel) * (Equip_Save) * (GCF)$$

Where:

Num_vehicles: Number of trucks that are equipped with APUs = 35

Hours: Average number of hours the equipment will be used = 1,900 hour/year

Idle_Fuel: Average amount of diesel fuel one of your trucks uses per hour of idling = 1 gal/hour

Equip_Save = Average fractional reduction in idling fuel use for the APUs = 0.82 (Source: Appendix E, Table 4)

GCF = Conversion factor for diesel fuel = 1.147 GGE/gallon

Calculation

Petroleum Reduced (in GGE):

$$GGE_Reduced = (Num_vehicles) * (Hours) * (Idle_Fuel) * (Equip_Save) * (GCF)$$

$$GGE_Reduced = (35\ vehicles) * (1900\ hour/vehicle) * (1\ gal/hour) * (0.82) * (1.147\ GGE/gal)$$

$$GGE_Reduced = 62,546\ GGE$$

Idling Time Reduction

A fleet mandates idling time reductions to reduce the amount of diesel fuel used in trucks while idling.

Equation

There is one equation used for this method.

Petroleum Reduced (in GGE):

$$GGE_Reduced = (Num_vehicles) * (Time) * (Idle_Fuel) * (Days) * (GCF)$$

Where:

Num_vehicles: Number of trucks required to reduce idling time = 75

Time: Number of hours that the requirement will reduce the average truck's idling time by = 8 hours per day

Idle_Fuel = Average amount of diesel fuel one trucks uses per hour of idling = 0.9 gallons per hour

Days = Average truck idles 260 nights/year

GCF = Conversion factor for diesel fuel = 1.147 GGE/gal

Calculation

Petroleum Reduced (in GGE):

$$GGE_Reduced = (Num_vehicles) * (Time) * (Idle_Fuel) * (Days) * (GCF)$$

$$GGE_Reduced = (75\ vehicles) * (8\ hour/day) * (0.9\ gal/hour) * (260\ days/year) * (1.147\ GGE/gal)$$

$$GGE_Reduced = 161,039\ GGE/year$$

Appendix G: Alternative Compliance Case Studies

This section features two case studies to illustrate the relationship between the Standard Compliance requirements and Alternative Compliance option and the special considerations fleets face if they over or under comply. In the first case, the fleet participates in the Alternative Compliance option for five years. Some years it over complies and others it under complies. In the second case, a fleet switches between the Standard and Alternative Compliance options.

Case Study 1: Alternative Compliance Option with over and under Compliance

Year 1: MY 2008

This fuel provider fleet anticipated starting MY 2008 with 18 pre-waiver required AFVs and acquiring 10 LDVs during the model year, resulting in 9 AFV requirements. Accordingly, the fleet's ACV inventory for MY 2008 is 27 (18 + 9). The fleet's fuel use records for MY 2006 showed that the vehicles in its LDV fleet use an average of 700 GGE of fuel per year. This becomes the fleet's baseline fuel use for MY 2008 and for future years the fleet chooses the Alternative Compliance option. Thus, its petroleum reduction requirement is 18,900 GGE (27 x 700 = 18,900).

The fleet developed a plan to reduce its petroleum consumption by 19,000 GGE through a combination of E85 (10,000 GGE), HEVs (4,000 GGE), and B20 (5,000 GGE). Planned reductions using E85 and HEVs were achieved. However, due to the high demand for biodiesel, it was able to acquire only enough to run B2 in its vehicles. Therefore the fleet only used 550 GGE of biodiesel for a total petroleum reduction of 14,550 GGE, a shortfall of 4,350 GGE.

Since this is the fleet's first year in the program, it has no roll-over petroleum reductions banked, but it does have 8 banked credits available from the Standard Compliance requirements. The number of credits required is calculated as follows:

$$\text{Credits required} = \frac{(\text{GGE reduction required} - \text{GGE reduction achieved} - \text{Roll overs})}{\text{Annual average GGE use per LDV}}$$

$$\text{Credits required} = (18,900 - 14,550)/700$$

$$\text{Credits required} = 6.2$$

$$\text{Credits required} = 6 \text{ after rounding to the nearest whole number}$$

Table 1. Year 1: MY 2008 Summary

ACV inventory	27 vehicles
Average annual fuel use per LDV	700 GGE
Petroleum reduction requirement	18,900 GGE
Actual petroleum reduction achieved	14,550 GGE
Deficit/excess	-4,350 GGE
Compliance status	Under comply
Credits required/applied	6
Credits remaining in Standard Compliance	2

Table 2. Year 2: MY 2009 Summary

ACV inventory	33 vehicles
Average annual fuel use per LDV	700 GGE
Petroleum reduction requirement	23,100 GGE
Actual petroleum reduction achieved	24,400 GGE
Deficit/excess	+1,300 GGE
Compliance status	Over comply
Credits required/applied	0
Credits remaining in Standard Compliance	2
Roll overs banked	1,300 GGE

Applying the 6 credits left its banked credit total at 2. Table 1 summarizes Year 1.

Year 2: MY 2009

The fleet anticipated starting the year with 24 ACVs since 3 were retired during Year 1. Ten LDV acquisitions are planned for MY 2009, leading to an AFV acquisition requirement of 9 for the year. The resulting total ACV inventory for Year 2 is 33 ACVs (24 + 9 = 33). Using the MY 2006 value of 700 GGE used per vehicle in its LDV fleet, its petroleum reduction requirement is 23,100 GGE (33 x 700 = 23,100).

The fleet developed a plan to reduce its petroleum consumption by 23,100 GGE through a combination of E85 (10,000 GGE), HEVs (4,000 GGE), and B5 (9,100 GGE). The fleet's total actual petroleum reduction turned out to be 24,400 GGE resulting in an over compliance of 1,300 GGE.

Table 3. Year 3: MY 2010 Summary

ACV inventory	32 vehicles
Average annual fuel use per LDV	700 GGE
Petroleum reduction requirement	22,400 GGE
Actual petroleum reduction achieved	24,400 GGE
Deficit/excess	+2,000 GGE
Compliance status	Over comply
Credits required/applied	0
Credits remaining in Standard Compliance	2
Roll overs banked in 2010	2,000 GGE
Roll-over balance	3,300 GGE

The fleet was able to bank 1,300 GGE as roll over. It also has 2 remaining banked credits from the Standard Compliance requirements.

Year 3: MY 2010

For MY 2010, the fleet anticipates its ACV inventory to start at 23 since 10 will be retired before the start of MY 2010. The fleet further plans to add 10 LDVs, leading to an AFV acquisition requirement of 9 (90% of 10 planned LDV acquisitions for Year 3). Therefore, the total ACV inventory for Year 3 is 32 ACVs ($23 + 9 = 32$). Using the baseline value of 700 GGE of fuel per vehicle per year, its petroleum reduction requirement is 22,400 GGE ($32 \times 700 = 22,400$).

The fleet developed a plan to reduce its petroleum consumption by 22,400 GGE through a combination of E85 (12,000 GGE), HEVs (6,000 GGE), and B5 (4,400 GGE). The plan was based on using B5 rather than B20, which remained unavailable. The fleet's total actual petroleum reduction of 24,400 GGE was an over compliance of 2,000 GGE.

The fleet was able to bank 2,000 GGE as roll over, which brought the balance of banked rollovers to 3,300 GGE. It also has 2 remaining banked credits from the Standard Compliance requirements.

Year 4: MY 2011

For Year 4, the fleet will start with 27 ACVs because 5 will be retired before the start of the year. The fleet will again add 10 LDVs during Year 4, increasing the ACV inventory by 9 to 36. (90% of 10 planned LDV acquisitions

Table 4. Year 4: MY 2011 Summary

ACV inventory	36 vehicles
Average annual fuel use per LDV	700 GGE
Petroleum reduction requirement	25,200 GGE
Actual petroleum reduction achieved	25,200 GGE
Deficit/excess	0
Compliance status	Comply
Credits required/applied	0
Credits remaining in Standard Compliance	2
Roll overs banked in 2010	0
Roll-over balance	3,300 GGE

Table 5. Year 5: MY 2012 Summary

ACV inventory	36 vehicles
Average annual fuel use per LDV	700 GGE
Petroleum reduction requirement	25,200 GGE
Actual petroleum reduction achieved	21,400 GGE
Deficit/excess	-3,800 GGE
Compliance status	Under comply
Credits required/applied	1
Credits remaining in Standard Compliance	1
Roll-over balance	3,300 GGE
Roll overs applied	3,300 GGE
Remaining under compliance	500 GGE

for Year 4). Using the baseline fuel use of 700 GGE per vehicle per year, its petroleum reduction requirement is 25,200 GGE ($36 \times 700 = 25,200$).

The fleet developed a plan to reduce its petroleum consumption by 25,200 GGE through a combination of E85 (15,000 GGE), HEVs (6,000 GGE), and B20 (4,200 GGE), which is now available in its area. The fleet's total actual petroleum reduction for Year 4 was 25,200, exactly on target.

The fleet continued to maintain a roll-over balance of 3,300 GGE and 2 remaining banked credits from the Standard Compliance program.

Table 6. Case 1: Compliance Summary

	MY 2008	MY 2009	MY 2010	MY 2011	MY 2012
Actual ACV inventory	27	33	32	36	36
Average annual fuel use per LDV	700	700	700	700	700
Petroleum reduction requirement	18,900	23,100	22,400	25,200	25,200
Actual reduction achieved	14,550	24,400	24,400	25,200	21,400
Over/(under) compliance	(4,350)	1,300	2,000	0	-3,800 ²
Credits required	6 ¹	0	0	0	1
Banked credits available	8	2	2	2	2
Credits applied	6	0	0	0	1
Roll overs banked	0	1,300	2,000	0	0
Roll overs available	0	1,300	3,300	3,300	3,300
Roll overs applied	0	0	0	0	3,300

¹ Standard compliance credits must be used to meet petroleum reduction shortfalls in Year 1 because there is no roll-over balance available.

² Roll-over credits are applied before Standard Compliance credits.

Year 5: MY 2012

The total ACV inventory for Year 5 is projected to be 36 ACVs—36 ACVs from Year 4 minus 9 retirements prior to the start of MY 2012 plus 9 AFV requirements during MY 2012. Using the baseline fuel use of 700 GGE per vehicle per year, its petroleum reduction requirement is 19,800 GGE (36 x 700 = 25,200).

The fleet developed a plan to reduce its petroleum consumption by 25,200 GGE through a combination of E85 (15,000 GGE), HEVs (6,000 GGE), and B20 (4,200 GGE), which is still available in its area. Lack of availability of B20 resulted in the fleet's total actual petroleum reduction for Year 5 of 21,400. This was an under compliance of 3,800 GGE.

The fleet used its roll-over balance of 3,300 GGE leaving a negative balance of 500 GGE. It needed 1 of its 2 remaining banked credits from the Standard Compliance program as calculated by the following equation:

$$\text{Credits required} = \frac{(\text{GGE reduction required} - \text{GGE reduction achieved} - \text{Roll overs})}{\text{Annual average GGE use per LDV}}$$

$$\text{Credits required} = (25,200 - 21,400 - 3,300)/700$$

$$\text{Credits required} = 0.71$$

$$\text{Credits required} = 1 \text{ after rounding to the nearest whole number}$$

Table 6 summarizes the various scenarios under Case 1.

Case Study 2: Standard and Alternative Compliance Options

Year 1: MY 2008

This alternative fuel provider fleet applied for and received a waiver to enter the Alternative Compliance option for the first time. The fleet anticipated starting the year with 52 pre-waiver AFVs and adding 20 LDVs during MY 2008, leading to an AFV requirement of 18 (90% of 20 planned LDV acquisitions). This resulted in a total of 70 vehicles in the fleet's MY 2008 ACV inventory. Its fuel use records show that each vehicle in its LDV fleet used an average of 800 GGE of fuel per year in MY 2006. Thus, its petroleum reduction requirement is 56,000 GGE (70 x 800 = 56,000).

The fleet developed a plan to reduce its petroleum consumption by 56,000 GGE through a combination of E85 (30,000 GGE), HEVs (18,000 GGE), and VMT reduction (8,000 GGE). Its actual petroleum reduction amount for Year 1 was 54,500 GGE, an under compliance of 1,500 GGE.

Since this was the fleet's first year in the program, it has no roll-over petroleum reductions banked, but it does have 2 banked credits available from the Standard Compliance requirements. The number of credits required is calculated as follows:

$$\text{Credits required} = \frac{(\text{GGE reduction requirement} - \text{GGE reduction achieved} - \text{Roll overs})}{\text{Annual average GGE use per LDV}}$$

$$\text{Credits required} = (56,000 - 54,500 - 0)/800$$

$$\text{Credits required} = 1.875$$

$$\text{Credits required} = 2$$

Year 2: MY 2009

The fleet remained in the Alternative Compliance option for Year 2. It planned to start the year with 66 ACVs (since 4 ACVs were scheduled to be retired before MY 2009 began), and add 18 ACVs (90% of 20 planned LDV acquisitions for Year 2). The total ACV inventory for Year 2 is 84 AFVs (66 + 18 = 84). Using the baseline fuel use of 800 GGE of fuel per vehicle per year, its petroleum reduction requirement for MY 2009 is 67,200 GGE (84 x 800 = 67,200).

The fleet developed a plan to reduce its petroleum consumption by 67,200 GGE through a combination of E85 (35,000 GGE), HEVs (22,000 GGE), and VMT reduction

Table 7. Year 1: MY 2008 Summary

ACV inventory	70 vehicles
Average annual fuel use per LDV	800 GGE
Petroleum reduction requirement	56,000 GGE
Actual petroleum reduction achieved	54,500 GGE
Deficit/excess	-1,500 GGE
Compliance status	Under comply
Credits required/applied	2
Credits remaining in Standard Compliance	0

Table 8. Year 2: MY 2009 Summary

ACV inventory	84 vehicles
Average annual fuel use per LDV	800 GGE
Petroleum reduction requirement	67,200 GGE
Actual petroleum reduction achieved	64,500 GGE
Deficit/excess	-2,700 GGE
Compliance status	Under comply
Credits remaining in Standard Compliance	0
Roll overs banked	0
Credits required to be purchased	3

(10,200 GGE). The fleet's total actual petroleum reduction was 64,500 GGE, an under compliance of 2,700 GGE.

Since the fleet had used its credits from Standard Compliance, it was required to purchase Standard Compliance credits to offset its deficit of 2,700 GGE.

$$\text{Credits required} = \frac{(\text{GGE reduction requirement} - \text{GGE reduction achieved} - \text{Roll overs})}{\text{Annual average GGE use per LDV}}$$

$$\text{Credits required} = (67,200 - 64,500 - 0)/800$$

$$\text{Credits required} = 3.375$$

$$\text{Credit purchases required} = 3$$

Year 3: MY 2010

The fleet remained in the Alternative Compliance option for Year 3. It started the year with 79 ACVs after 5 were retired and added 18 ACVs based on its AFV requirement for Year 3 (90% of 20 planned LDV acquisitions for Year 3). The total ACV inventory for Year 3 is 97 AFVs

Table 9. Year 3: MY 2010 Summary

ACV inventory	97 vehicles
Average annual fuel use per LDV	800 GGE
Petroleum reduction requirement	77,600 GGE
Actual petroleum reduction achieved	78,100 GGE
Deficit/excess	+500 GGE
Compliance status	Over comply
Credits remaining in Standard Compliance	0
Roll overs banked	500

Table 10. Year 4: MY 2011 Summary

ACV inventory	92 vehicles
Average annual fuel use per LDV	NA
Petroleum reduction requirement	0
Actual petroleum reduction achieved	N/A
Credits required	18
Biodiesel purchased	4,500 gallons
Biodiesel credits earned	9
AFVs purchased	12
Total credits earned	21
Excess credits	3
Compliance status	Over comply
Credits remaining in Standard Compliance	3
Roll overs banked	500

(79 + 18 = 97). Based on its average fuel use of 800 GGE of fuel per vehicle per year, its petroleum reduction requirement is 77,600 GGE (97 x 800 = 77,600).

The fleet developed a plan to reduce its petroleum consumption by 77,600 GGE through a combination of E85 (36,900 GGE), HEVs (22,000 GGE), VMT reduction (8,500 GGE), and idle reduction (10,200 GGE). The fleet's total actual petroleum reduction was 78,100 GGE, an over compliance of 500 GGE.

The fleet was able to roll over the 500 GGE.

Year 4: MY 2011

The fleet decided to return to the Standard Compliance requirements for Year 4. It started the year with a total of 92 ACVs in its ACV inventory. However, since the

Table 11. Year 5: MY 2012 Summary

ACV inventory	111 vehicles
Average annual fuel use per LDV	800 GGE
Petroleum reduction requirement	88,800 GGE
Actual petroleum reduction achieved	88,000 GGE
Deficit/excess	-800 GGE
Compliance status	Under comply
Credits remaining in Standard Compliance	3
Rollovers banked	500
Roll overs used to meet petroleum reduction requirement	500
Roll-over balance	0

fleet did not choose the Alternative Compliance option for this year, it has no petroleum reduction requirements for the year. It only has AFV acquisition requirements under the Standard Compliance requirements.

Since it wanted to buy 20 LDVs this year, the fleet has an AFV acquisition requirement of 18 (90% of 20 planned LDV acquisitions for Year 4). The fleet exceeded its requirements by purchasing 4,500 gallons of B100 and purchasing 12 AFVs. Thus, the fleet earned 21 credits—50% of its requirements were met with biodiesel (with 450 gallons not receiving credit) and 12 additional credits were earned based on the acquisition of the 12 AFVs. The 3 excess credits earned by the fleet above its requirement were banked for future use.

Year 5: MY 2012

The fleet returned to the Alternative Compliance option for Year 5. Its ACV inventory had the following composition: 84 ACVs of the 92 with which it started Year 4 (8 scheduled for retirement before MY 2012), 9 AFVs acquired for credit under the Standard Compliance requirements in Year 4 (the 3 that earned banked credits are not included), and 18 AFV requirements for Year 5 (90% of 20 planned LDV acquisitions for Year 5). Thus, the total ACV inventory for Year 5 was 111 ACVs (84 + 9 + 18 = 111). Using the fleet's average fuel use of 800 GGE per vehicle per year, its petroleum reduction requirement is 88,800 GGE (111 x 800 = 88,800).

The fleet developed a plan to reduce its petroleum consumption by 88,800 GGE through a combination of E85 (38,000 GGE), HEVs (22,000 GGE), VMT reduction (12,500 GGE), and B20 (12,000 GGE). The fleet also

Table 12. Case 2: Compliance Summary

	MY 2008	MY 2009	MY 2010	MY 2011	MY 2012
Actual ACV inventory	70	84	97	92	111
Average annual fuel use per LDV	800	800	800	N/A	800
Petroleum reduction requirement	56,000	67,200	77,600	0	88,800
Actual reduction achieved	54,500	64,500	78,100	N/A	88,000
Over/(under) compliance	(1,500)	(2,700)	500	+3 credits	(800)
Credits required	2	0	0	18	0
Credits earned	0	0	0	21	0
Banked credits available	2	0	0	3	3
Credits applied	2	0	0	0	0
Roll-overs banked	0	0	500	N/A	500
Roll-overs applied	0	0	0	N/A	500
Credits purchased	0	3	0	0	0

planned to use idle reduction (4,300 GGE). The fleet's total actual petroleum reduction was 88,000 GGE, an under compliance of 800 GGE. The fleet requires 800 roll overs but only has 500 available from Year 3. After these are applied, the fleet still has a deficit of 300 GGE and may require banked credits. However, as shown above, since the banked credits required are fewer than 0.5, the fleet does not have to apply any of its banked credits.

$$\text{Credits required} = \frac{(\text{GGE reduction requirement} - \text{GGE reduction achieved} - \text{Roll overs})}{\text{Annual average GGE use per LDV}}$$

$$\text{Credits required} = (88,800 - 88,000 - 500)/800$$

$$\text{Credits required} = 0.375$$

$$\text{Credits purchases required} = 0$$

Table 12 summarizes the various scenarios in Case 2.

Appendix H: Helpful Links

- EPart State and Alternative Fuel Provider Rule
www1.eere.energy.gov/vehiclesandfuels/epact/state/index.html
- Standard Compliance
 - Alternative Fuel Transportation Program Final Rule
www.eere.energy.gov/vehiclesandfuels/epact/pdfs/fed_reg.pdf
 - AFV Acquisition Requirements Final Rule
www.eere.energy.gov/afdc/pdfs/fprovrule.pdf
 - Reporting Form DOE/FCVT/101
www.eere.energy.gov/vehiclesandfuels/epact/docs/fleet_report_05_2004.xls
- Alternative Compliance
 - Alternative Compliance Final Rule
www.eere.energy.gov/vehiclesandfuels/epact/pdfs/alt_compliance_rule.pdf
 - Alternative Compliance Planning Tool
www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/
 - ACV Inventory
www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/view_acv.cgi
 - Intent to Apply for a Waiver
www.eere.energy.gov/vehiclesandfuels/epact/state/acp_tool/waiver_app0.cgi
- Alternative Fuels Data Center
www.eere.energy.gov/afdc
- Alternative Fuels Station Locator
www.eere.energy.gov/afdc/infrastructure/locator.html
- E85 Fleet Toolkit
www.eere.energy.gov/afdc/e85toolkit
- Clean Fleet Guide
www.eere.energy.gov/fleetguide
- HEV Cost Calculator
www.eere.energy.gov/cleancities/hev/cost_calc.html
- Flexible Fuel Vehicle Cost Calculator
www.eere.energy.gov/fleetguide/cost_anal.php?0/E85*Flex*Fuel
- Natural Gas Cost Calculator
www.eere.energy.gov/fleetguide/ngvcalc.html
- Truck Stop Electrification Locator
www.eere.energy.gov/cleancities/idle/station_locator.html
- Fuel Economy Guide
www.fueleconomyguide.gov
- Transportation Energy Data Book
<http://cta.ornl.gov/data/index.shtml>

DISCLAIMER

This publication is intended to familiarize interested parties with the requirements of the U.S. Department of Energy's Alternative Fuel Transportation Program, 10 CFR Part 490. It is not intended as a complete representation of the regulation, nor does it contain the complete information necessary for compliance with the regulation. In the event of any discrepancy, real or perceived, between the language of this publication and that of the regulation, the language of the regulation should be considered as governing.



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April 2007

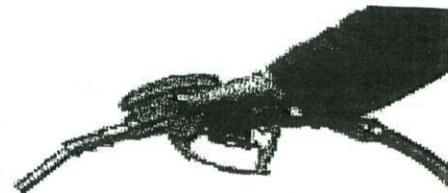
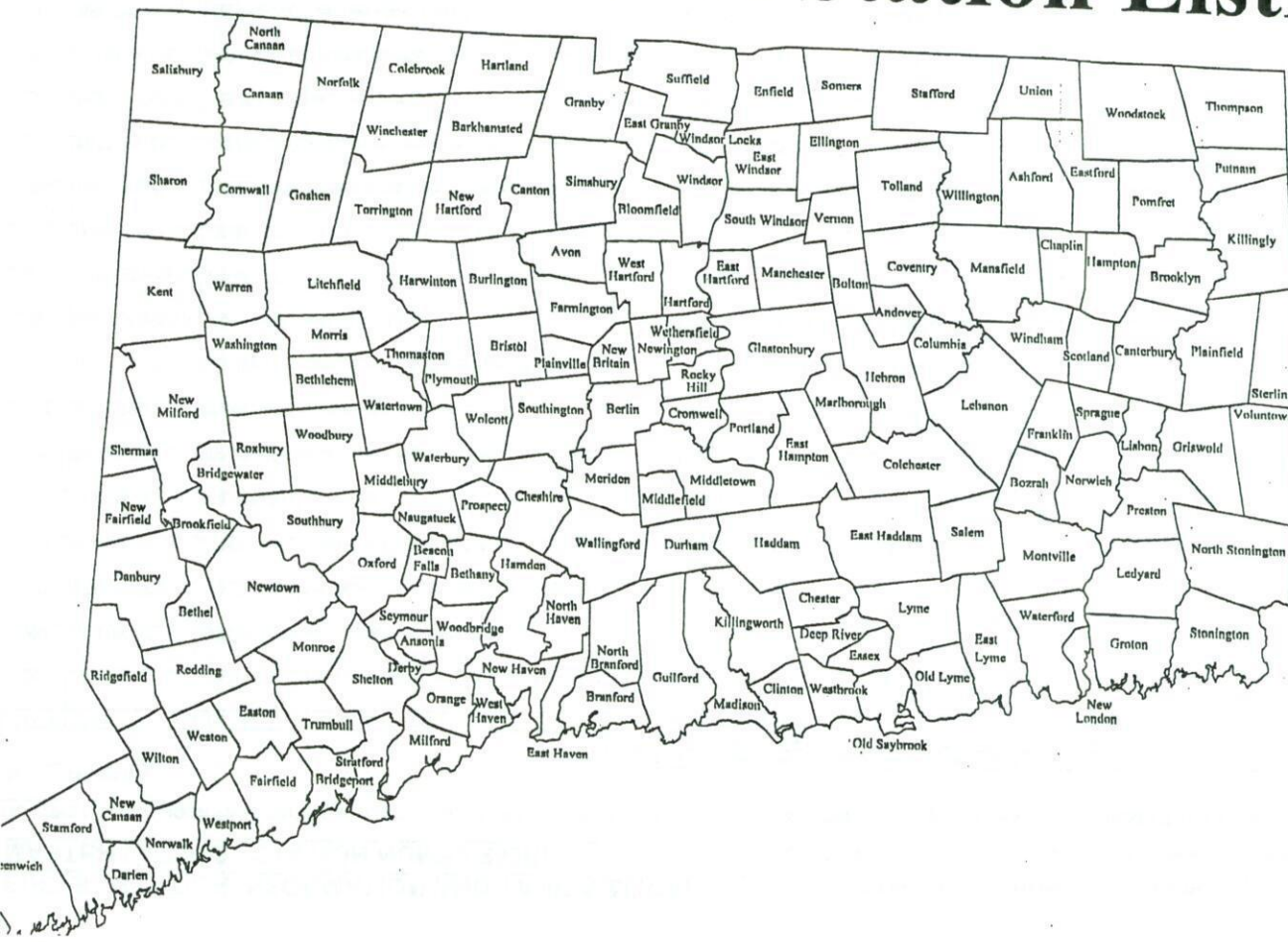


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State of Connecticut

Department of Transportation

Fuel Station Listing



Revised : May 1, 2007

FUELS - STATION INFORMATION AND TANK SIZE/CAP/ MASTER LISTING - STATION NUMBER ORDER

ROUTINE STATION HOURS ARE FROM 8:00 A.M. TO 3:30 P.M. AT DOT FACILITIES

REV: 06/25/07 js

1. DO NOT order regular unleaded in place of ETHANOL - Lock caps-Refer to Fuels Con
2. DO NOT allow the BIO-DIESEL VENDOR to deliver REGULAR DIESEL unless the vendor is the same
3. CAN allow Regular Diesel into BIO-DIESEL TANK if it is AN EMERGENCY (notify Fuels Control)

STA. #	TOWN	TEL. NO.	STATION LOCATION	UNLEADED	UNLEADED	UNLEADED	UNLEADED	UNLEADED	UNLEADED	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	COUNTY	Locked Gate	Gen. g
				Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order			
				UNLEADED	UNLEADED	Qty - 90%	UNLEADED	UNLEADED	Qty - 90%	DIESEL	DIESEL	Qty - 90%	DIESEL	DIESEL	Qty - 90%			
201	DARIEN	203-655-1467	Brookside Drive (Behind Rest Area) - I-95 (Service Area)	10,000	9,728	8,700				10,000	9,728	8,700				Fairfield	YES	G
202	WESTPORT	203-227-7692	900 Post Road - I-95 - Exit 18							4,000	3,918	3,500				Fairfield	YES	
203	STRATFORD	203-579-6208	Surf Avenue - I-95 - Exit 30, Surf Ave. & Lordship Blvd.	4,000	3,918	3,500				4,000	4,150	3,700				Fairfield	YES	
204	MILFORD	203-877-1870	44 Banner Drive - I-95 - Exit 40 (W.B.)	6,000	5,929	5,300				6,000	5,929	5,300				New Haven	NO	G
205	NEW HAVEN	203-789-7842	35 Sea Street							4,000	3,918	3,500				New Haven	YES	
206	BRANFORD	203-488-8450	89 Leetes Island Road - I-95 - Exit 56	4,000	3,918	3,500				4,000	3,918	3,500				New Haven	YES	
207	GUILFORD	203-453-7027	593 Boston Post Road - I-95 - Exit 59	4,000	4,150	3,700				4,000	4,150	3,700				New Haven	NO	
208	WESTBROOK	860-399-9346	Horse Hill Road (RT. 145) - DOT WINTER ONLY	4,000	3,918	3,500				4,000	3,918	3,500				Middlesex	YES	
209	OLD SAYBROOK	860-388-0347	660 Middlesex Turnpike	10,000	9,816	8,800				10,000	9,816	8,800				Middlesex	YES	G
211	NORWICH-EGP	860-892-2291	171 Salem Turnpike (Front Bldg.), I-395 - Exit 80	4,000	4,150	3,700				4,000	4,150	3,700				New London	NO	
212	NORWICH-Occum	860-822-6507	Route 97, 125 Taftville Occum Road, I-395 - Exit 85							8,000	7,829	7,000				New London	NO	
506	TYLERVILLE	860-345-2258	105 Bridge Street, Route 154, Route 9 - Exit 7	4,000	4,219	3,800				4,000	4,219	3,800				Middlesex	YES	G
507	EAST HAVEN	203-466-5332	2100 North High Street (Route 100)	4,000	4,150	3,700				4,000	4,150	3,700				New Haven	YES	G
510	NEW MILFORD	860-354-4253	Kent Road (Route 7)	4,000	4,030	3,600				4,000	4,030	3,600	6,000	5,929	5,300	Litchfield	NO	
511	THOMASTON	860-585-2800	359 South Main Street	6,000	5,929	5,300										Litchfield	YES	G
512	BROOKFIELD	203-740-3622	1050 Federal Road (Route 7)	3,000	3,271	2,900				3,000	3,271	2,900				Fairfield	YES	G
514	BEACON FALLS	203-881-0529	Breault Road, Off Route 42	4,000	3,918	3,500				4,000	3,918	3,500	4,000	3,918	3,500	New Haven	YES	G
517	SOUTHBURY	203-264-5383	75 Old State Road (Route 6), I-84 - Exit 15							above ground 1,000	1,000	900	above ground 1,000	1,000	900	New Haven	NO	
519	DANBURY	203-797-4157	Stadley Rough Road, I-84 - Exit 7	4,000	4,014	3,600	6,000	5,998	5,400	6,000	5,893	5,300				Fairfield	NO	
520	EAST WINDSOR	860-623-4473	Route 5, I-91 - Exit 45	4,000	4,150	3,700				4,000	4,150	3,700				Hartford	YES	G
521	HIGGANUM	860-345-5111	11 Candlewood Hill Road, Route 9A - Exit 10	4,000	3,918	3,500				4,000	3,918	3,500				Middlesex	NO	G
525	UNION	860-684-3852	Route 190 (East), I-84 - Exit 73	4,000	4,150	3,700				4,000	4,046	3,600				Tolland	NO	
527	WALLINGFORD	203-265-0106	Wharton Brook Connector, I-91 - Exit 13	4,000	4,150	3,700				6,000	5,712	5,100				New Haven	NO	G
529	GROTON	860-536-3985	81 Welles Road	10,000	9,438	8,500				6,000	6,085	5,500				New London	NO	
535	NORFOLK	860-542-5684	190 North Street (Route 272)							4,000	4,150	3,700				Litchfield	NO	
539	NORTH CANAAN	860-824-7244	21 Main Street (Route 7 & Route 44)	2,500	2,319	2,000				4,000	3,782	3,400				Litchfield	YES	G
541	WETHERSFIELD	860-529-7233	501 Goff Road (South of Route 175)	8,000	7,734	7,000				8,000	8,050	7,200				Hartford	YES	G
542	HARTFORD	860-566-3102	49 Jennings Road, I-91 - Exit 33	4,000	4,150	3,700				4,000	4,150	3,700				Hartford	YES	G

FUELS - STATION INFORMATION AND TANK SIZE/CAP/
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STA. #	TOWN	TEL. NO.	STATION LOCATION	UNLEADED	UNLEADED	UNLEADED	UNLEADED	UNLEADED	UNLEADED	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	COUNTY	Locked Gate	Gen. g
				Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order			
				UNLEADED	UNLEADED	Qty - 90%	UNLEADED	UNLEADED	Qty - 90%	DIESEL	DIESEL	Qty - 90%	DIESEL	DIESEL	Qty - 90%			
										BIO-DIESEL 5-07								
543	TORRINGTON	860-482-8482	80 Fowler Avenue	4,000	3,918	3,500				6,000	5,929	5,300				Litchfield	YES	
546	AVON	860-677-0953	3 Chidsey Road	4,000	4,150	3,700				4,000	4,150	3,700				Hartford	YES	G
										BIO-DIESEL 9-06								
548	WEST WILLINGTON	860-429-4211	41 Tolland Turnpike - Route 74, I-84 - Exit 69 (East)	4,000	4,150	3,700				4,000	4,150	3,700				Tolland	NO	
549	VERNON	860-875-4993	37 Campbell Avenue, I-84 - Exit 65 (South)	6,000	6,085	5,400				6,000	6,085	5,400				Tolland	YES	G
550	BOLTON	860-649-1708	362 Boston Turnpike - Route 6	4,000	4,150	3,700				4,000	4,150	3,700				Tolland	YES	G
552	MANSFIELD	860-423-0124	100 North Frontage Road	6,000	6,085	5,500				6,000	6,084	5,500	6,000	6,084	5,500	Tolland	YES	G

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STA. #	TOWN	TEL. NO.	STATION LOCATION	UNLEADED	UNLEADED	UNLEADED	UNLEADED	UNLEADED	UNLEADED	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	DIESEL	COUNTY	Locked Gate	Gen. G
				Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order	Tank Size	Actual Size	Maximum Order			
				UNLEADED	UNLEADED	Qty - 90%	UNLEADED	UNLEADED	Qty - 90%	DIESEL	DIESEL	Qty - 90%	DIESEL	DIESEL	Qty - 90%			
BIO-DIESEL 5-07																		
554	WATERFORD	860-443-1617	20 Industrial Drive, I-395 - Exit 77	4,000	4,150	3,700				4,000	4,150	3,700				New London	NO	
556	MIDDLETOWN	860-344-2981	Paddock Road, Off Route 155, Route 9 - Exit 11	4,000	3,918	3,500				4,000	3,918	3,500				Middlesex	YES	G
557	CANTERBURY	860-546-7110	158 Westminster Road, Route 14	4,000	4,150	3,700				4,000	3,995	3,600				Windham	NO	
559	EAST HAMPTON	860-295-9040	Route 66 & Route 16 - DOT WINTER ONLY							1,000	1,009	900				Middlesex	YES	
560	WINDSOR	860-688-4848	345 Bloomfield Avenue, Route 305, I-91 - Exit 37	4,000	3,918	3,500				6,000	5,929	5,300				Hartford	YES	G
561	POMFRET	860-928-4098	31 Killingly Road, Route 101	4,000	3,918	3,500				4,000	3,918	3,500				Windham	NO	
564	EAST HARTFORD	860-569-2669	161 Clement Road	4,000	4,219	3,800				8,000	7,670	6,900				Hartford	YES	
BIO-DIESEL 1-01																		
566	PUTNAM	860-928-4588	3 Industrial Park Road, Route 12	6,000	6,085	5,500				8,000	7,950	7,200				Windham	NO	G
567	MARLBOROUGH	860-295-6160	84 South Main Street, Old Route 2	4,000	4,150	3,700				4,000	4,150	3,700				Hartford	NO	
568	FARMINGTON	860-677-7223	Route 6 & South Road, I-84 - Exit 38 (N/E of South Road)	4,000	4,150	3,700				4,000	4,150	3,700				Hartford	YES	
569	NORTH HAVEN	203-407-0526	311 State Street	4,000	3,918	3,500				4,000	3,918	3,500				New Haven	YES	G
BIO-DIESEL 9-06																		
570	WINCHESTER	860-738-6582	800 Torrington Road, (1-1/2 Miles North of Rt. 151, Exit	6,000	5,712	5,200				4,000	4,150	3,700				Litchfield	NO	G
571	LISBON	860-889-6181	486 River Road, Route 12	4,000	4,150	3,700				4,000	4,150	3,700				New London	YES	G
572	SOUTHINGTON	860-628-7433	478 Mulberry Street (1-1/2 Miles S/E of I-84)	4,000	3,918	3,500				4,000	3,918	3,500				Hartford	YES	
BIO-DIESEL 11-01																		
576	TRUMBULL	203-380-3836	Nicols Avenue, (Exit 44 off Merritt Parkway)	4,000	3,918	3,500				4,000	3,918	3,500				Fairfield	YES	G
578	WATERBURY	203-596-4219	100 Chase River Road, Route 8 - Huntington Ave. Exit	8,000	7,950	7,200				8,000	7,950	7,200				New Haven	YES	G
579	THOMASTON	860-283-4526	Prospect Street Extension (1 Mile South of Route 6)							4,000	3,918	3,500				Litchfield	NO	
581	WOLCOTT	203-879-6077	1010 Wolcott Road - Route 69							4,000	4,030	3,600				New Haven	YES	
585	EAST GRANBY	860-688-6266	Route 20 & East Granby Road, I-91 - Exit 40	4,000	4,150	3,700				6,000	5,893	5,300				Hartford	NO	
586	SIMSBURY	860-658-4780	1549 Hopmeadow Street (Route 10 & 202)	4,000	4,150	3,700				4,000	4,150	3,700				Hartford	YES	
590	GLASTONBURY	860-633-1159	235 Oak Street, Route 2 - Exit 8	4,000	4,150	3,700				4,000	4,150	3,700				Hartford	YES	
593	NEW HAVEN	203-389-3080	140 Pond Lily Avenue	9,500	9,520	8,600				9,500	9,520	8,600				New Haven	NO	G
598	OLD SAYBROOK	860-388-3366	441 Middlesex Turnpike - BRIDGE							4,000	3,782	3,400				Middlesex	NO	
599	CORNWALL	860-672-6672	24 Bunker Hill Road, Route 4	4,000	3,995	3,600				4,000	3,995	3,600				Litchfield	YES	G
1507	NEW CANNAN	203-972-5098	47 Gerdes Road - Back of Service Area, Merritt Parkway	4,000	3,918	3,500				4,000	3,918	3,500				Fairfield	NO	G
1513	ORANGE	203-799-5073	Baldwin Road and Route 34, Merritt Parkway - Exit 58	4,000	4,150	3,700				4,000	4,150	3,700				New Haven	NO	
1523	COLCHESTER	860-537-2357	394 Old Hartford Road, Route 2 - Exit 17	4,000	4,150	3,700				4,000	4,150	3,700				New London	NO	G

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				Tank Size UNLEADED	Actual Size UNLEADED	Maximum Order Qty - 90%	Tank Size UNLEADED	Actual Size UNLEADED	Maximum Order Qty - 90%	Tank Size DIESEL	Actual Size DIESEL	Maximum Order Qty - 90%	Tank Size DIESEL	Actual Size DIESEL	Maximum Order Qty - 90%			
1535	FRANKLIN	860-887-2620	Route 32 - 1/4 Mile North of Yantic Interchange of Rt. 2	4,000	4,150	3,700				BIO-DIESEL 5-07			4,000	4,150	3,700	New London	YES	
1540	LITCHFIELD	860-567-8487	438 Bantam Road, Route 202	4,000	4,150	3,700				6,000	5,712	5,200				Litchfield	NO	G
1545	ROCKY HILL	860-258-1980	860 Brook Street (Stores Central Warehouse)	6,000	6,085	5,500				4,000	4,148	3,700				Hartford	YES	G
1548	MERIDEN	203-238-6240	239 Miller Avenue, Route 15	4,000	4,150	3,700				4,000	4,150	3,700				New Haven	NO	G
1549	NEWINGTON	860-594-3423	2800 Berlin Turnpike, Motor Pool	6,000	5,998	5,400	ETHANOL (E-85)			above ground	1,000	1,040	900			Hartford	YES	

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				Tank Size UNLEADED	Actual Size UNLEADED	Maximum Order Qty - 90%	Tank Size UNLEADED	Actual Size UNLEADED	Maximum Order Qty - 90%	Tank Size DIESEL	Actual Size DIESEL	Maximum Order Qty - 90%	Tank Size DIESEL	Actual Size DIESEL	Maximum Order Qty - 90%			
										BIO-DIESEL 5-07								
70	HARTFORD	860-566-7037	233 Maxim Road - Brainard Airport	4,000	3,918	3,500				4,000	3,918	3,500				Hartford	YES	
71	WINDSOR LOCKS	860-627-3119	Elia Grasso Turnpike - BRADLEY INTERNATIONAL	4,000	4,150	3,700				6,000	6,136	5,500				Hartford	YES	
72	GROTON	860-445-2824	159 Tower Avenue - GROTON/NEW LONDON AIRPORT	6,000	6,016	5,400				6,000	6,016	5,400				New London	YES	
74	OXFORD	203-264-8010	288 Christian Road / OXFORD AIRPORT	1,000	1,040	900				1,000	1,040	900				New Haven	YES	
524	HARTFORD	860-566-7118	309 Buckingham Street	10,000	9,818	8,800	10,000	9,818	8,800							Hartford		
551	BRIDGEPORT	203-579-6131	1106 North Avenue (CORRECTIONAL FACILITY)	2,500	2,649	2,400										Fairfield		
704	WAREHOUSE PT.	860-292-4040	35 Gardner Street (STATE RECEIVING HOME)	1,000	1,009	900										Hartford		
706	ROCKY HILL	860-721-5815	287 West Street, (VETERAN'S HOME & HOSPITAL)	2,400	2,319	2,000				2,400	2,319	2,000				Hartford		
716	WILLIMANTIC	860-465-5355	83 Windham Street (EASTERN CONN. STATE UNIV)	4,000	4,012	3,600				2,500	2,649	2,400				Windham		
719	MIDDLETOWN	860-262-5727	Silver Street (CT. VALLEY HOSPITAL)	4,000	4,150	3,700				1,000	1,040	900				Middlesex		
726	NEW HAVEN	203-974-8442	123 Huntington Street (AGRICULTURAL EXPERIMENT)	1,000	1,010	900										New Haven		
727	SOUTHBURY	203-586-2654	Route 172 (SOUTHBURY TRAINING SCHOOL)	5,000	5,029	4,500				3,000	3,275	2,900				New Haven		
730	HAMDEN	203-974-8618	890 Evergreen Avenue, Mount Carmel (AGRIC. EXP. ST)	250	260	230				250	260	230				New Haven		
732	CHESHIRE	203-250-2667	900 Milldale Road (CORRECTIONAL FACILITY)	5,000	4,835	4,300										New Haven		
734	HAMDEN	203-281-8314	825 Hartford Turnpike (HIGH MEADOWS HOSPITAL)	1,000	1,009	900										New Haven		
739	BRIDGEPORT	203-579-6365	500 Palisade Avenue (BULLARD HAVEN TECH. SCHOOL)	1,000	971	800										Fairfield		
760	EAST LYME	860-691-6442	Route 156 (CORRECTIONAL FACILITY - NIANATIC)	4,000	3,918	3,500				4,000	3,918	3,500				New London		
761	NIANTIC	860-691-6060	Smith Street (CAMP ROWLAND)	1,000	1,000	900										New London		
774	NEW HAVEN	203-392-6076	501 Crescent Street (SOUTHERN CONN. STATE UNIV)	3,000	3,000	2,700				1,000	1,000	900				New Haven		
775	NORWICH	860-885-2153	171 Salem Turnpike, East Great Plains	6,000	5,929	5,300										New London		
779	NEW BRITAIN	860-832-2320	1615 Stanley Street (CENTRAL CONN. STATE UNIV)	4,000	4,150	3,700				2,500	2,500	2,250				Hartford		

EMERGENCY FUEL SPILL NUMBER FOR DEP - 24 HOURS 860-424-3338

BIO-DIESEL USAGE

Started using Bio-Diesel February 2000



		Feb - Dec. 2000	Jan - Dec 2001	Jan - Dec 2002	Jan - Dec 2003	Jan - Dec 2004	Jan - Dec 2005	Jan - Dec 2006	Jan - May 16 2007
Station 204	Milford	55,863.00	51,991.21	47,512.05	48,655.00	23,567.38	49,306.58	49,813.53	20,554.94
Station 209	Old Saybrook	*****	*****	*****	*****	*****	*****	11,526.44	16,590.72
Station 548	Willington	*****	*****	*****	*****	*****	*****	5,899.60	10,272.55
Station 566	Putnam	31,919.00	40,454.97	36,677.80	42,004.66	15,781.45	38,655.74	29,548.90	14,150.13
Station 570	Winchester	*****	*****	*****	*****	*****	*****	7,451.70	13,878.30
Station 576	Trumbull	16,830.00	40,254.00	31,803.80	38,999.50	17,488.30	45,093.20	36,068.90	17,184.10
Station 201	Darien	*****	*****	*****	*****	*****	*****	*****	*****
Station 519	Danbury	*****	*****	*****	*****	*****	*****	*****	2,356.40
Station 560	Windsor	*****	*****	*****	*****	*****	*****	*****	1,405.30

Yearly Totals : 104,612.00 132,700.18 115,993.65 129,659.16 56,837.13 133,055.52 140,309.07 96,392.44

Grand Total : 909,559.15

The following fuel stations
began dispensing Bio-Diesel (B20)

Station 209 - Saybrook 9/14/2006
Station 548 - Willington 9/6/2006
Station 570 - Winchester 9/26/2006

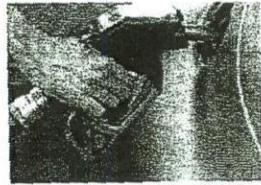
Station 201 - Darien to be opened May 22nd.
Station 519 - Danbury Opened April 26, 2007
Station 560 - Windsor Opened May 1, 2007



BIO - DIESEL FUEL

\$2.0412
PRICE PER GALLON
FIXED PRICE

E-85 Usage



E - 85 Fuel
Price per Gallon
\$4.2135
FIXED PRICE

E-85 Usage

Station 1549 Newington 2800 Berlin Turnpike

6/24/2003 Initial Delivery of Product -- 5,560 Gallons

	Fuel	Dispensed
2003	6/25/03 -- Dec 31	8,306 Gallons
2004	Jan. 1 -- Dec. 31	18,838 Gallons
2005	Jan. 1 -- Dec. 31	20,925 Gallons
2006	Jan. 1 -- Dec. 31	28,236 Gallons
2007	Jan. 1 -- April 30	9,307 Gallons
	6/25/03 -- 4/30/07 Total Dispensed	85,612 Gallons

Station 519 Danbury Stadley Rough Road

12/9/2004 Initial Delivery of Product -- 3,615 Gallons

	Fuel	Dispensed
2004	Dec. 9 - Dec 31	126 Gallons
2005	Jan. 1 -- Dec. 31	4,265 Gallons
2006	Jan. 1 -- Dec. 31	4,752 Gallons
2007	Jan. 1 -- April 30	1,112 Gallons
	12/09/04 -- 4/30/07 Total Dispensed	10,255 Gallons